

Emissions measurement and reporting approaches for the public sector: Systematic review

Annex A



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Executive summary

This report provides a comprehensive analysis of greenhouse gas (GHG) emissions reporting approaches, from frameworks used by public and private sector organisations in the UK, as well as international private companies. Some of these frameworks have a specific focus on GHG emissions reporting, whilst others are broader climate or sustainability reporting frameworks, where GHG emissions reporting forms an element of the framework.

Whilst this research has a focus on GHG emissions reporting for the public sector, private sector frameworks were also reviewed to provide a comprehensive view of the different emissions reporting approaches within the UK and surrounding economic region, to generate insights into best practices, common challenges, emerging trends and potential areas for improvement that could be relevant to the public sector emissions reporting.

Each framework reviewed was assessed based on the following six key criteria:

- **Context of framework:** Provides a setting for the framework with dates of initiation and updates.
- **Scope depth:** What specific GHG emissions data points must be reported or calculated based upon the Greenhouse Gas Protocol (GHGP).
- **Reporting requirements:** Defines what additional information is required to be reported as part of fulfilling the framework.
- **Target depth:** Provides information on targets set by the framework and whether they require them to be set by the reporting organisation.
- **Mechanism that facilitates decarbonisation:** Considers routes by which frameworks enable or support decarbonisation.
- **Effectiveness in facilitating decarbonisation:** Discusses any reviews of the effectiveness of the framework.

Overall, nine public sector frameworks were reviewed, including three from devolved governments. Two UK private sector frameworks and five international private sector frameworks were also reviewed to provide a comprehensive view of the different emissions reporting approaches.

Of the frameworks reviewed, twelve utilise the GHGP to define emission categories and boundaries, and four frameworks employ alternative but similar methods for emissions accounting. Among the twelve frameworks reporting based on the GHGP scopes, five have some form of mandatory reporting.

Within all twelve frameworks reporting based on GHGP scopes, Scope 1 and 2 emissions are required to be reported, while only two require reporting of material Scope 3 emissions. Seven

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frameworks require partial Scope 3 reporting, and the remaining frameworks allow space for, or recommend reporting of, Scope 3 emissions.

Target-setting also varies across the frameworks. Six frameworks have high-level, long-term targets such as net zero by 2050 or maintaining a global warming temperature of 1.5°C or less. Only two define lower-level targets, such as for the reporting bodies, while six require the reporting bodies to set their own low-level targets. Additionally, five frameworks provide detailed guides or tools to enable reporting bodies to develop their own strategies and targets.

There is limited alignment in the final delivery of reports to a central authority. Six of the UK public sector frameworks individually collate reports and generate framework-scale analysis of GHG emissions. However, limited crossover in reporting bodies restricts analysis of GHG emissions across the UK frameworks.

A key focus of this research has been to build an understanding of the mechanisms through which emissions measurement and reporting leads to decarbonisation. Through analysis of the frameworks, it has become apparent that they have not always been designed with one clear mechanism to support decarbonisation in mind; there is often overlap between mechanisms and the strength to which the frameworks are able to support in these ways. The key mechanisms which emissions reporting frameworks enable change and lead to decarbonisation were further explored through expert interviews. The combined findings from both this systematic review and expert interviews are discussed in the main report.

Due to the infancy of some of the frameworks and the general lack of information, there is limited evidence within this desk review to indicate how effective the frameworks are in achieving the objectives that they set out to achieve. There are however some key points which are likely to impact on the effectiveness of the frameworks. These were also further explored through the expert interviews. The findings are discussed in more detail within the main report.

Finally, through the systematic review, a reporting and measurement pathway categorisation schematic has been developed. The schematic illustrates the categories of measurement and reporting within a framework. It is designed so that pathways can be followed to outline the elements that make up a specific framework. The schematic, along with detailed descriptions of the categories and the elements held within each of the categories, are provided in the main report.

Definitions

Acronyms are given in full when first used in the report but are also summarised here for clarity.

Accuracy: Degree of closeness between a measurement and its true value

BEIS: Department for Business, Energy and Industrial Strategy

CBAM: Carbon Border Adjustment Mechanism

CCAT: Climate Change Assessment Tool

CCC: Climate Change Committee

CCG: Clinical Commissioning Group

CDSB: Climate Disclosure Standards Board

CHP: Combined Heat and Power

CO₂e: A standardised unit used to express the total impact of various greenhouse gases, converting them into an equivalent amount of carbon dioxide based on their global warming potential.

CSRD: Corporate Sustainability Reporting Directive

DAERA: Department of Agriculture, Environment and Rural Affairs (Northern Ireland)

DECC: Department for Energy and Climate Change

DEFRA: Department for Environment, Food and Rural Affairs

DESNZ: Department for Energy Security and Net Zero

DfE: Department for Education

Direct emissions: Emissions of greenhouse gases released directly from the actions of the entity, such as burning fuel or venting fluorinated gases.

EAUC: Alliance for Sustainability Leadership in Education

EFRAG: European Financial Reporting Advisory Group

ERIC: Estates Returns Information Collection (NHS)

EMR: Estates Management Report

ESG: Environment, Social and Governance

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ESOS: Energy Saving Opportunities Scheme

ESRS: European Sustainability Reporting Standards

ETS: European Trading System

FE: Further Education

Framework: This refers to a system of rules that define methods and reporting requirements for measurement and or management of greenhouse gas emissions.

FReM: Government Financial Reporting Manual (UK Government)

GGCs: Greening Government Commitments

GHG: Greenhouse gas. These gases absorb infrared radiation emitted from the Earth and re-radiate it back. Within the Greenhouse Gas Protocol, the main emissions to account for are carbon dioxide, methane, nitrous oxide, and fluorinated gases.

GHGP: Greenhouse Gas Protocol. An established framework for measuring greenhouse gas emissions.

GRI: Global Reporting Initiative

HE: Higher Education

HESA: Higher Education Statistics Agency

HFS: Health Facilities Scotland

HOST: Health Outcomes of Stationary Sources Tool

HOTT: Health Outcomes of Travel Tool

IFRS: International Financial Reporting Standards

IFRS SDS: IFRS Sustainability Disclosure Standards

Indirect emissions: Emissions generated through operational requirements, such as electricity use or products that generate greenhouse gases during their lifecycle.

ISO: International Organisation for Standardisation

ISSB: International Sustainability Standards Board

JISC: Joint Information Systems Committee

kWh: Kilowatt-hours (energy unit)

GA: The Local Partnerships Greenhouse Gas Accounting

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NFRD: Non-Financial Reporting Directive

NHS: National Health Service

Mandatory: Legislation has been enacted to establish the framework, specifying that reporting to the framework is mandatory.

MBT: Mechanical Biological Treatment

Precision: Degree of closeness between repeated measurements or measurements under the same conditions, regardless of how close to the true value.

Required: The framework necessitates providing information as a minimum requirement to meet the standards outlined within it.

SASB: Sustainability Accounting Standards Board

SCATTER: Setting City Area Targets and Trajectories for Emissions Reduction

Scope 1: Direct emissions of greenhouse gases from sources within a defined boundary of control.

Scope 2: Indirect emissions resulting from purchased energy, typically electricity or purchased heat.

Scope 3: Covers 15 categories of indirect emissions listed within Appendix A of this document. These relate to all indirect emissions (not included in Scope 2) that occur in the value chain of the reporting company, including both upstream and downstream emissions.

SECR: Streamlined Energy and Carbon Reporting

SCEF: Standardised Carbon Emissions Framework for Further and Higher Education

SSN: Sustainable Scotland Network

TCFD: Task Force on Climate-related Financial Disclosures

UKRI: UK Research & Innovation

Voluntary: The framework requests or suggests information for reporting. However, even without this voluntary information, submission would still meet the defined standard if the minimum necessary information is provided.

VRF: Value Reporting Foundation

Introduction

In 2024, Energy Saving Trust undertook, on behalf of the Department for Energy Security and Net Zero (DESNZ), a comprehensive review of emissions measurement and reporting approaches relevant to the UK public sector.

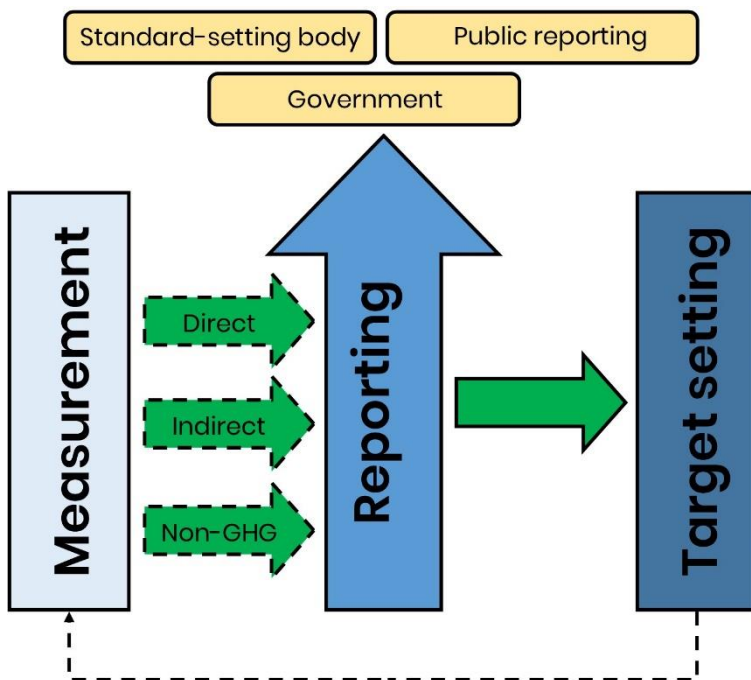
A wide range of frameworks exist for emissions reporting – some with specific focus on GHG emissions. Others are broader climate or sustainability reporting where GHG emissions forms part of the reporting framework, leading to a further range of emissions measurement methods to satisfy the needs of these frameworks.

The overarching aim of this research was to discover these reporting systems and measurement methods, and to understand why each is used, and what outcomes they help to drive. Furthermore, following this systematic review, a categorisation schematic was developed. The schematic defines the different pathways that a framework can follow and can be used to look at existing frameworks or to support the development of new frameworks. The schematic is presented and described in the main report.

Within this systematic review, the key objectives were to:

1. Identify and critically review the range of approaches to emissions reporting and map these to the supported decarbonisation outcomes.
2. Identify and critically review the range of approaches to emissions measurement which allow different emissions reporting approaches.
3. Consider what types of target-setting various approaches to emissions reporting support, and what decarbonisation outcomes they help to enable.

Figure 0-1: Methods for investigating reporting frameworks



The primary methods used were a systematic review of literature, and expert interviews with standard-setting bodies, standard users, and independent experts. This report details the findings of the systematic review, which will sit as a Technical Annex of the main report. The main report includes the findings from this systematic review, as well as the expert interviews.

In this report, UK public sector reporting initiatives, devolved government initiatives, and relevant UK and international private sector initiatives are presented in turn. Within each section, the key initiatives are identified, and their characteristics described. In order to identify and describe each framework, a series of focus areas were developed. These were applied to all frameworks with the aim of producing a consistent level of detail. Further analysis on the effectiveness of the frameworks is included within the main report.

The reasoning behind the selection and development of focus areas is described in detail in Appendix A.

- **Context of framework:** Defines the history and impending changes of each system in order to facilitate an understanding of the origin of reporting methods. Since many reporting schemes, measurement methods and target setting systems are formed from the evolution, combination or divergence of previous methods, this consideration will support the additional information on each system highlighted by each of the previous focus areas.
- **Scope depth:** Defines the level of inclusion of direct and indirect emissions in the reporting method. The three Scopes defined by the GHG Protocol (GHGP) Corporate Standard and widely adopted in the sector are used to provide definition, thus providing a quick understanding of the GHG accounting requirements. Scope 1 emissions are

direct emissions released into the atmosphere from sources owned or controlled by the reporting organisation. Scope 2 are indirect emissions from purchased energy, whilst Scope 3 are indirect emissions from the value chain, including upstream and downstream emissions.

A list of Scope 3 emissions categories is provided in Appendix B. Reporting methods requiring partial inclusion of Scope 3 are common. Where possible, Scope depth has been indicated graphically using a two-row system. Where only some Scope 3 categories are listed as compulsory, it should be assumed that all other categories are voluntary.

- **Reporting requirements:** Defines the level of detail required in reporting. This includes aspects such as who is required to report, what they must report, and how they can report. Outside of reporting GHG emissions this can include action plans or progress towards a target, and methods of reporting via an Excel tool, online portal or a format described in a reporting guide.
- **Target depth:** Defines the requirements for developing and implementing targets within the reporting framework. The framework may provide higher-level targets, such as a 90% reduction in total GHG emissions by 2045, or lower-level targets like greening a fleet. Conversely, the framework may not offer any targets, requiring the reporting institution to develop them independently.
- **Mechanism that facilitates decarbonisation:** Defines how the methods within the framework aim to drive change in behaviour. This area considers the mechanisms through which an emissions reporting method causes change – whether this is directly during the emissions measurement or reporting stages, or indirectly through driving change by encouraging or mandating target setting and strategy generation – and any repeated reporting defined by the standard.
- **Effectiveness in facilitating decarbonisation:** Defines the level of success of a method in operation. In some cases, information is not available to determine the effectiveness of the framework due to the framework being relatively new or reports on the effectiveness not yet being published. Where information is available, the extent to which the framework has had an impact on targets being achieved is provided. A more critical review of the extent to which the way the framework has been set up is likely to achieve its intended aim is discussed in the main report.

UK Public sector

This section of the report outlines the main frameworks that exist within the UK public sector and looks specifically at central government, the education sector, the health sector and local government.

Central government

Greening Government Commitments (GGCs)

Context of framework

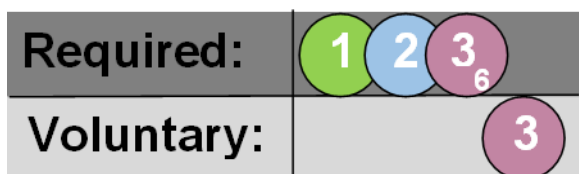
Established in 2010/11, the Greening Government Commitments (GGCs) framework sets targets and reporting requirements for UK government departments to reduce their environmental impact. Currently in a third iteration (2021-2025), the GGCs have undergone two previous phases: 2011-2015 and 2016-2020. The framework sets out applicable targets, reporting requirements and guidance for seven key commitments:

- Commitment A – Mitigating climate change: working towards net zero by 2050
- Commitment B – Minimising waste and promoting resource efficiency
- Commitment C – Reducing our water use
- Commitment D – Procuring sustainable products and services
- Commitment E – Nature Recovery: making space for plants and wildlife
- Commitment F – Adapting to climate change
- Commitment G – Reducing environmental impacts from Information Communication Technology (ICT) and Digital

Central government departments must report on behalf of non-ministerial departments, non-departmental public bodies and executive agencies.¹ The GGCs do not include the devolved administrations (see **Devolved government**).

Scope depth

Figure 0-2: Scope depth of Greening Government Commitments framework



¹ [Defra \(2022\) Greening government commitments: reporting requirements for 2021 to 2025](#)

Commitment A² in the GGCs requires³ that departments report on Scope 1 and 2 emissions, and Scope 3 business travel. Where primary data is not available for a given emissions scope, estimations may be made using suitable proxies (direct comparison, pro-rata extrapolation, benchmarking). Accounting for emissions adheres to the GHGP – accomplished via the template provided by Defra and data contractors (overseen by DESNZ) which utilises appropriate emissions factors.

Reporting requirements

Departments will report on their progress every quarter – unless they are specifically exempt – with the results published in the GGCs Annual Report for each financial year. Departments are required (whereby required indicates necessity in order to fulfil request) to submit their data for commitments A to C (with the exception of a handful of questions) quarterly. Departments are required to submit their responses for commitments D to G (procurement, nature recovery, adaptation, ICT impacts) annually.

In addition to departments reporting emissions under commitment A, the following wider reporting is set out in the GGCs:

- Commitment A – Must report the total number of cars and vans, total vehicle fleet by vehicle type (cars and vans), fuel type and the number of vehicles on order and due delivery date.
- Commitment A – Required to report the total distance travelled by international business flight, disaggregated by flight length and class.
- Commitment B – Required to report in tonnes the waste recycled, reused, composted and incinerated.
- Commitment B – Must report on the number of consumer single use plastic items procured for the office estate.
- Commitment B – Departments with over 50 full time staff and or greater than 500 square metre floor area offering food, must quantify and report their food surplus and waste arising from their food service provision, including canteens and cafes.
- Commitment B – Required to report on the introduction and implementation of reuse schemes.
- Commitment B – Required to report on the amount of office paper consumption.
- Commitment C – Departments should measure and report the total metered water consumption from their office and non-office estate, and report which steps, if any, have been taken during the reporting year to reduce water consumption.
- Commitment D – Departments are required to answer a set of questions to evidence their achievements against each aspect of the procurement commitment.

² Mitigating climate change: working towards net zero by 2050 – reduce the overall GHG emissions from a 2017 to 2018 baseline and also reduce direct GHG emissions from estate and operations from a 2017 to 2018 baseline.

³ See [Definitions section](#) for the definitions of “mandatory”, “required” and “voluntary”

- Commitment E – Departments and partner organisations with the greatest potential to improve biodiversity should develop and deliver annual Nature Recovery Plans for their land, estates, development and operations.
- Commitment F – Departments are required to report whether they have a climate change adaptation strategy and provide reasons if not. Departments should develop a climate change adaptation action plan, including existing or planned actions in response to the risks identified.
- Commitment G – Departments should report on the adoption of the ‘greening government: ICT and digital services strategy’ and associated targets, ensuring they provide membership to the sustainable technology advice and reporting team, (who manage and deliver the GGCs ICT reporting).

Reporting departments are required to establish quality management systems for preventing and correcting errors. Verifiable, primary data is requested where possible and must be stored in a fashion to enable appropriate entering into the reporting template. When verifiable primary data is not available or of poor quality, estimates may be utilised. The reports are collected and checked centrally.

In addition to GGCs reporting, public sector bodies are required to assess whether there are entities which fall within their boundary for consolidation purposes which meet the criteria for Streamlined Energy and Carbon Reporting (SECR) and would therefore be required to also report under this scheme (at least two of: turnover of >£36 million, balance sheet assets of >£18 million, or >250 employees).

Target depth

In collaboration with DESNZ, each department establishes low-level targets that are aligned to the overall targets of the GGCs framework. These targets encompass overall emissions and direct emission reduction targets, with slight variations for each reporting department. Direct emissions are defined as those originating from the estate and operations for which the department is directly responsible for (Scope 1). Overall emissions include direct emissions as well as Scope 2, alongside business travel related emissions within Scope 3 of the GHGP.

A full list of central government departments and their specific overall and direct emissions reduction targets can be found in Annex A of the Greening Government Commitments 2021-2025 policy paper.⁴

The average reduction target for direct emissions is 49.5% with a standard deviation of 10.7%. The average reduction target for overall emissions is 24.6% with a standard deviation of 8.6%.

The GGCs also set out sub-targets for commitments A to G as follows:

- 25% of the government car fleet to be ultra-low emission vehicles (ULEV) by 31 December 2022, and for 100% of the government car and van fleet to be fully zero emissions at the tailpipe by 31 December 2027.

⁴ [Defra \(2022\) Greening government commitments 2021 to 2025: Policy Paper](#)

- Reduce the emissions from domestic business flights by at least 30% from a 2017 to 2018 baseline, and report the distance travelled by international business flights.
- Update organisational travel policies so that they require lower carbon options to be considered first as an alternative to each planned flight.
- Departments that already have policies in place to compensate for emissions are encouraged to report on their implementation.
- Reduce the overall amount of waste generated by 15% from the 2017 to 2018 baseline.
- Reduce the amount of waste going to landfill to less than 5% of overall waste.
- Increase the proportion of waste that is recycled or reused to at least 70% of overall waste.
- Remove consumer single use plastic (CSUP) from the central government office estate.
- Reduce government's paper use by at least 50% from a 2017 to 2018 baseline.
- Reduce water consumption by at least 8% from the 2017 to 2018 baseline.

Mechanism that facilitates decarbonisation

GGCs set out to increase transparency and hold government departments accountable against the set targets through reporting requirements. Through working with the departments to define targets specific to them, it ensures that the targets are suitable in driving them to reduce GHG emissions.

Effectiveness in facilitating decarbonisation

The GGCs annual reports from 2011/12 until 2020/21 are available. Reports following the new commitments 2021-2025 are not yet published.⁵ The 2020/21 annual report⁶ states the government met many of its commitments, with its original target of a 32% reduction in emissions from a FY 2009/10 baseline met in 2017, three years earlier than planned. A new target was therefore created for a 43% reduction in emissions from the 2009/10 baseline.

In 2020 to 2021 the government reduced its GHG emissions by 57% from the baseline year of 2009/10, higher than the 50% that had been achieved the previous year 2019/20. It is unclear whether this reduction is due to action that departments have taken to reduce emissions alone due to the impact that COVID-19 public health restrictions are likely to have had on reduced building energy use. Looking at pre COVID-19 results, 19% of the 2019 to 2020 reduction of 50% was due to the decarbonisation of the national grid, whereas 31% was due to the improved management of the estate. Whilst this provides some evidence that the framework has helped in reducing emissions, without an understanding of what would have happened without the framework it is not possible to wholly attribute to the reduction in emissions to the framework.

⁵ [Defra and Cabinet Office \(2023\) Greening Government Commitments annual reports](#)

⁶ [Defra \(2023\) Greening Government Commitments 2020 to 2021 annual report](#)

HM Treasury Sustainability Reporting Guidance

Context of framework

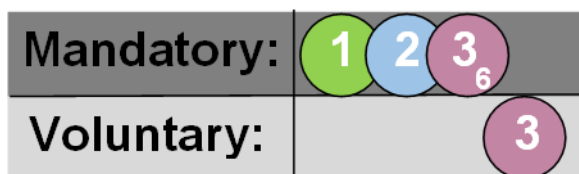
All government departments report to the Treasury by preparing annual reports and accounts following the Government Financial Reporting Manual (FReM). The FReM “specifies these bodies are required to report on sustainability, unless exempted from doing so”. HM Treasury introduced Sustainability Reporting Guidance (SRG) for central government accounts in 2010/11. To promote consistency and reduce reporting burden, the SRG⁷ has been developed to align where possible with GGCs reporting requirements detailed above.

Key areas where the SRG for annual reports and accounts and GGCs requirements that are less well aligned include:

- Aim and focus – Treasury annual reports and accounts provide Parliament with an overview of performance, whereas the GGCs annual report is not prepared specifically for Parliament.
- Legislative and regulatory requirements – Treasury annual reports and accounts reflect developments in private (and public) sector reporting to support the continued production of comparable, high-quality annual reports and accounts.
- Timing and guidance/framework cycles – Treasury SRG for annual reports and accounts is updated annually, contrasted with GGCs reporting requirements which are typically set for a defined commitment period (e.g. five years).

Scope depth

Figure 0-3: Scope depth of HM Treasury Sustainability Reporting Guidance



For most government departments, emissions reporting scope under the SRG will be the same as under the GGCs reporting framework. Key differences in scopes are summarised below.

- Uncommon scope 1 and 2 emissions – SRG includes relatively rare cases where department operations produce uncommon Scope 1 and Scope 2 GHG emissions, in categories which are not specifically measured and reported under the GGCs framework:
 - Manufacturing and processing emissions – e.g. catalytic cracking in petrochemical processing, perfluorocarbon emissions from aluminium smelting, road building

⁷ [HM Treasury \(2023\) Sustainability Reporting Guidance: 2023-24](#)

- Other fugitive emissions in addition to refrigeration and air conditioning equipment, including intentional and unintentional releases (e.g. equipment leaks, coal piles, wastewater treatment, pits, cooling towers, and gas processing facilities)
- Agriculture and land management
- Health and defence laboratories
- Inclusion of Nitrogen Trifluoride from a small number of industrial processes
- Carbon offsets – SRG sets out how public bodies that choose to use carbon offsets should report this in their annual reports and accounts. For GGCs reporting, departments that have policies in place to compensate for emissions are encouraged to report on their implementation.

Reporting requirements

All government departments report to the Treasury by preparing annual reports and accounts.

Alignment with GGCs

For consistency, the reported figures to comply with the SRG should be consistent with the figures submitted to Defra for the GGCs annual report. If there is a difference, explanations should be provided during the GGCs reporting process.

The SRG sets out minimum statutory reporting requirements for GHG emissions, waste and finite resource consumption that are largely aligned to GGCs. In addition, the SRG sets out other reporting requirements aligned to GGCs (procuring sustainable products and services, nature recovery, adapting to climate change, reducing environmental impacts from ICT and digital).

Alignment with international frameworks

HM Treasury is mandating disclosure aligned to Climate-related financial disclosure (TCFD) in central government; the most recent SRG highlights that preparers of annual accounts and reports should consult TCFD guidance⁸ to determine if they are in scope of those requirements.

The SRG states that government will be cognisant of changes within standards set by the International Standards Setting Board (ISSB) and the International Public Sector Accounting Standards Board (IPSASB). ISSB is further discussed in the **International Financial Reporting Standards Foundation Sustainability Disclosure Standards (IFRS SDS)** section. IPSASB is in the early development of a public sector specific guidance on climate-related disclosure, which will primarily be based on the ISSB's standards.⁹

⁸ [HM Treasury, The Rt Hon John Glen MP, and Baroness Vere of Norbiton \(2023\) TCFD-aligned disclosure guidance for public sector annual reports](#)

⁹ [IPSASB Sustainability climate – related disclosures](#)

Accounting Officers across central government take ultimate responsibility for what is included in the annual report and accounts, including sustainability-related information. Senior management should provide appropriate assurance over the quality of financial and non-financial data and information included as part of sustainability reporting. Internal verification must include:

- Appropriate policies and procedures for recording and reporting data, which are consistent with the guidance on minimum requirements, and are applied in practice.
- Appropriate systems and processes to secure the quality of the data, minimising manual intervention and the number of data sources.
- Arrangements to ensure that relevant staff have the skills to produce reliable sustainability information.
- A robust system of internal control and validation.

Target depth

HM Treasury does not set targets outside those defined by the GGCs for which HM Treasury mirrors reporting requirements.

Mechanism that facilitates decarbonisation

HM Treasury SRG aims to promote transparency on public sector performance in sustainability and on a year-on-year basis. HM Treasury Sustainability Reporting Guidance and GGCs are now largely in line to reduce reporting burden, and work is underway to incorporate recommendations from the Task Force on Climate-related Financial Disclosures (TCFD) – for application from 2023/24 – to ensure that UK public sector reporting is aligned with global private sector reporting and developments by standard setters. Mandatory reporting promotes transparency on sustainability performance, which leads to public accountability and drives organisations to continuously improve their performance.

Effectiveness in facilitating decarbonisation

HM Treasury SRG are almost wholly in line with the GGCs and at the time of writing (May 2024) the annual reports for the GGCs 2021-22 and 2022-23 are not available but are expected to be published imminently. The annual reports will report on the extent to which targets have been met, which will provide some evidence of the effectiveness of the framework. However, without a counterfactual, it is not possible to evidence what may have happened in the absence of the framework. Alignment with other national and international reporting frameworks has the advantage of streamlining emissions reporting and reducing reporting burdens. However, this also means its effect in facilitating decarbonisations cannot be isolated and it will also mirror the failures or benefits of the other frameworks.

Education

Standardised Carbon Emissions Framework for Further and Higher Education

Context of framework

The EAUC (Environmental Association for Universities and Colleges), in collaboration with the Royal Anniversary Trust and the Department for Education have established the Standardised Carbon Emissions Framework (SCEF) for Further and Higher Education (FE and HE respectively).

The methodology is based upon the GHG Protocol with guidance on actions from basic reporting to best practice and provides interpretations that are unique for the education sector. The framework was developed with wide consultation across the FE/HE sector, and FE and HE organisations are recommended to report their emissions using this framework. Discussions are ongoing with the Department for Education (DfE) and JISC to update the Higher Education Statistics Agency (HESA) Estates Management Report (EMR). HESA merged with the Joint Information Systems Committee (JISC) in Northern Ireland and England in 2022.

Alongside development of SCEF, the Royal Anniversary Trust released a report with recommendations to the government. Those which relate to carbon measurement and reporting are as follows:¹⁰

- Require publicly funded research bodies, including UK Research & Innovation (UKRI), to ensure transparent principles of sustainable travel and related emissions are mandatory within research-led funding bids. Following this, a voluntary environmental sustainability concordat co-developed by more than 25 organisations across the UK research and innovation sector was launched in April 2024.¹¹
- Make the data from existing carbon reporting requirements – e.g. Streamlined Energy and Carbon Reporting (SECR), Energy Savings Opportunity Scheme (ESOS) – available via a dedicated online portal, for utilisation in measuring detailed supply chain emissions.
- Incorporate sustainability and carbon reporting modules within the Department for Business, Energy and Industrial Strategy (BEIS) 'Help to Grow' scheme to increase carbon literacy amongst SMEs and support emissions reporting.
- Ring-fence the proportion of carbon emissions that tertiary education is responsible for from the Public Sector Decarbonisation Scheme, delivered by Salix Finance, specifically for the sector and improve access for the institutions most in need. There is now a ring-fenced proportion of carbon emissions for the tertiary education sector.

¹⁰ [The Royal Anniversary Trust \(n.d\) Accelerating the UK tertiary education sector towards net zero: A sector-led proposal for action and connected thinking](#)

¹¹ [EAUC \(2024\) Environmental Sustainability Concordat Launched](#)

Scope depth

Figure 0-4: Scope depth of Standardised Carbon Emissions Framework



The SCEF enables a coherent reporting framework for these institutions for all Scopes, including 15 categories within Scope 3. By utilising SCEF, the Department for Education (DfE) hopes to set a baseline in 2024 and targets will follow from 2025 based upon the baseline. Reporting within these Scopes is also catalogued into three data quality tiers, with tier 3 being the highest quality.¹²

Reporting requirements

As education is a devolved matter there are differing carbon reporting requirements across the nations. HE or FE organisations in England are not required to report on their emissions, but it is mandatory in Scotland and recommended in Wales as part of the devolved nation’s public sector bodies reporting mechanism.

In England, it is only a recommendation by the ESFA for colleges to report using the SECR. Reporting was mandatory, via the EMR, for English institutions until 2018 when the Higher Education Funding Council for England (HEFCE) was replaced by the Office for Students and the mandate was not transferred to the new entity.

The Platinum Jubilee Challenge sector-led proposal for action “Accelerating the UK Tertiary Education Sector towards Net Zero” in collaboration with DfE and the EAUC found all challenge participants were unified in support of making reporting mandatory for the sector. Within the document’s emissions reporting section on SCEF there is an expectation that this reporting will need to become mandatory to support the UK Governments net-zero target of 2050.¹³ DfE and DESNZ are in discussion with devolved administrations about future reporting. DfE has made a commitment within the Sustainability and Climate Change strategy to implement a comparable framework for 2024 and from 2025 to publish targets and institutional progress.

JISC merged with HESA in October 2022, and since the merge, JISC has collaborated with EAUC and the DfE. Though they do not set targets, generate frameworks, or gather generated reports in England, they do offer some supporting functions to support HE and FE institutions in their goal for further sustainability.

¹² [EUAC \(2022\) Standardised Carbon Emissions Reporting Framework, version 3.0](#)

¹³ [The Royal Anniversary Trust \(n.d\) Accelerating the UK tertiary education sector towards net zero: A sector-led proposal for action and connected thinking](#)

Target depth

There are not currently any targets set by DfE for English FE or HE institutions. A DfE policy paper from December 2023¹⁴ states “We will work together to set science-based targets from 2025, ensuring we play our part in reducing public-sector emissions against a 2017 baseline by:

- 50% by the end of Carbon Budget 5 (2032)
- 75% by the end of Carbon Budget 6 (2037)”

This strategy applies to the DfE and its agencies and public bodies, the education and children’s services systems in England including early years, schools, FE, HE and children’s social care.

Moreover, alongside the SCEF framework a cost of carbon reduction calculator¹⁵ has also been provided, delivered by EAUC, Association of University Directors in Estates (AUDE) and British Universities Finance Directors Group (BUFDG) and Energise in July 2023. This tool enables users to set reduction targets, tailor investments and predict likely outcomes of GHG reduction, thus helping institutions set their own targets with costed scenario-based investment strategies. This is only available with carbon emissions information, with a recommendation for this to be based on SCEF although other carbon emissions data can also be used.

Schools and other education providers outside of the FE and HE sector are hoped to be brought under the SCEF framework following learning outcomes from FE and HE institutions.

Mechanism that facilitates decarbonisation

The SCEF framework facilitates transparent, consistent, credible, and largely comparable disclosure, which will enable peer-to-peer benchmarking and learning. Follow-on support – in the form of a tool that enables FE and HE institutions to develop evidence-based, measurable targets and emission reduction strategies – facilitates decision-making and actions to decarbonise. The SCEF currently aims to bring about comparability through standardisation with DfE’s aims of a benchmarking year of 2024/25.

Once the GHG data is measured, ideally using the SCEF framework, users are able to use an additional “cost of net zero calculator” tool to develop and cost science-based carbon reduction strategies. This could increase uptake of SCEF reporting and develop targeted and cost-effective carbon reduction strategies, enabling the users to make quantitative scenario based and resource allocated GHG reduction strategies. However, no reporting mechanism or assisting in calculating carbon emissions using the SCEF framework has yet been developed.

Effectiveness in facilitating decarbonisation

As reporting is currently not mandatory in England and without a reporting mechanism based on the SCEF it is difficult to determine reporting levels. However, circa >90% of HE institutions

¹⁴ [DfE \(2023\) Sustainability and climate change: a strategy for the education and children’s services systems](#)

¹⁵ [EAUC The Cost of Net Zero](#)

do report via the EMR even though this is no longer mandatory in England. Therefore, if a reporting mechanism was introduced it could be assumed that a large proportion of institutions would use this.

The Welsh Government has also introduced a voluntary reporting scheme in 2021, with an associated reporting tool that Welsh universities are encouraged to report under, with only two Welsh universities not reporting under the scheme in 2021/22. All Scottish universities and colleges, since 2014, report under the Public Bodies Climate Change Duties Reporting with an increasing scope of reporting each year.

Health

NHS England

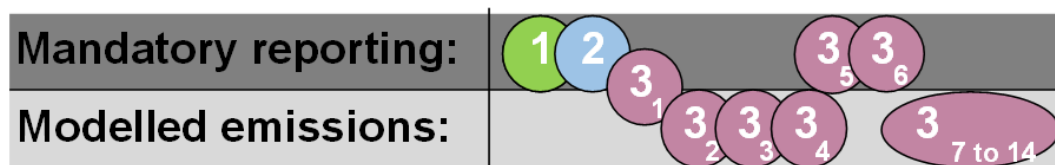
Context of framework

The Health and Care Act 2022¹⁶, committed the NHS to tackle its climate impact. The NHS in England aims to achieve net zero carbon emissions by 2040 for emissions directly controlled by the NHS and by 2045 for emissions it can influence.¹⁷ The Greener NHS team, which reports to the NHS Public Board, leads the implementation of the Net Zero NHS programme. The NHS has been monitoring and reporting its carbon footprint since 2008,¹⁸ and data collection and estimation for all three emission Scopes have been ongoing since 1990.¹⁹

The NHS adopts a health and wellbeing-focused approach, recognising how their efforts since 2010 have directly improved patient care, health, and wellbeing – for example, through reducing the health impact caused by air pollution, including asthma. Additionally, inhalers contribute an estimated 3% of NHS CO₂e emissions.²⁰ A survey from Ipsos MORI in 2015 demonstrated strong public support for the NHS to work in a more sustainable way (92% considered it very or fairly important)²¹, and a YouGov survey from August 2021 indicated strong staff engagement with the NHS Net Zero ambition (87% supported the ambition).²²

Scope depth

Figure 0-5: Scope depth of Greener NHS framework



¹⁶ [Health and Care Act 2022](#)

¹⁷ [Delivering a net zero NHS](#)

¹⁸ [Greener NHS: Governance and policy](#)

¹⁹ [NHS England \(2022\) Delivering a 'Net Zero' National Health Service](#)

²⁰ [Delivering a net zero NHS: Areas of focus](#)

²¹ [Public Health England and NHS England \(2016\) Public opinion survey 2015: Sustainability and the NHS, Public Health and Social Care system](#)

²² [Greener NHS: Public and staff opinions](#)

The NHS compiles data for Scopes 1, 2, and 3 (business travel, waste, and purchase information to assess GHG emissions from medications provided) from a range of sources, including the Estates Returns Information Collection (ERIC).²³ The analytical and modelling approach is provided within the Annex 2 of “Delivering a ‘Net Zero’ National Health Service”.²⁴

In addition to using GHGP Scopes 1, 2, and 3 for GHG accounting, the NHS has adopted an additional structure. Scopes 1, 2, and some aspects of Scope 3 fall within the “NHS Carbon Footprint,” which encompasses emissions directly controlled by the NHS. The remaining portions of Scope 3 – along with an additional category for patient and visitor travel that falls outside the standard GHGP – are grouped under the “NHS Carbon Footprint Plus.” This distinction allows specific targets and strategies to be developed for both categories of emissions: those within NHS's direct control and those within its influence. For a visual representation of how Scopes 1, 2, and 3 are divided into these two categories, refer to Figure 1 within “Delivering a ‘Net Zero’ National Health Service”.

Reporting requirements

Integrated care boards (ICBs) and trusts are now mandated to develop and publish Green Plans and include updates on the delivery of these plans as part of the NHS Standard Contract (Service Condition 18). They are also required to have a board-level lead for Green Plan delivery.²⁵ As set out in the Health and Care Act 2022, trusts must address the UK net zero emission target, environmental targets within the Environment Act 2021 and plans to adapt to any current or predicted impacts of climate change identified within the 2008 Climate Change Act.

The ERIC is a pre-existing mandatory annual collection conducted by NHS England, which compiles data on the costs, operation, and maintenance of the NHS estate, including buildings, equipment, and services. The system collects information related to energy expenditure, heating, waste, and water usage, categorising it into renewable and non-renewable energy sources. Notably, this data collection method shares similarities with ESOS (Energy Savings Opportunity Scheme) in terms of energy disclosure requirements, although it does not necessarily mandate providing CO₂e data.²³

Currently, local NHS organisations are not required to compile individual GHG emissions reports. Instead, data is gathered through existing mechanisms like ERIC and then extrapolated and modelled nationally. This approach reduces the reporting burden on local organisations while ensuring comprehensive coverage of NHS emissions.

Target depth

NHS has set two overarching targets:

- The NHS Carbon Footprint (emissions NHS control directly), net zero by 2040, with 80% reduction by 2028 to 2032 as compared to the 1990 baseline. The image on page 17

²³ [NHS Digital: Estates Returns Information Collection](#)

²⁴ [NHS England \(2022\) Delivering a ‘Net Zero’ National Health Service](#)

²⁵ [Greener NHS: Organisations](#)

within the “Delivering a ‘Net Zero’ National Health Service”, defines the scenario-based reduction plan for this cohort of emissions.

- The NHS Carbon Footprint Plus (emissions NHS can influence), net zero by 2045 with 80% reduction by 2036 to 2039 as compared to the 1990 baseline. The image on page 18 of the “Delivering a ‘Net Zero’ National Health Service”, defines the scenario-based reduction plan for this cohort of emissions.

Furthermore, the 2021/22 NHS Standard Contract required local organisations to develop green plans and initiatives, as stated within the updated guidance from 2021.²⁶

Due to the long timescale of emissions measurement recording, the NHS has implemented lower-level strategies to accomplish emissions reduction targets as detailed within the “Delivering a ‘Net Zero’ National Health Service” report.²⁷ The NHS has identified several key areas for emissions reduction within its carbon footprint (direct control):

- Anaesthetics and inhalers
- Travel and transport
- Estates and facilities

Additionally, the NHS Carbon Footprint Plus (emissions the NHS can influence) encompasses:

- New models of care and preventative medicines
- NHS purchasing
- Supply chain
- Travel and transport
- Medicines

Many of these target areas overlap, demonstrating the crossover between areas of influence and direct control. Details of the time-scaled emission reduction targets for both Scopes are provided in the referenced report on delivering a net zero NHS.

One way the NHS aims to achieve its lower-level emissions reduction targets is through the implementation of the Net Zero Building Standard.²⁸ The standard is not a reporting framework but rather a set of guidance documents designed to assist in constructing and retrofitting new NHS buildings. The standard aims to support the selection and development of buildings that align with the Greener NHS targets by considering both the direct control of the NHS’s carbon footprint through energy usage and the influence on emissions from construction and commuting. Meeting the Net Zero building standard has been mandatory for construction and refurbishment projects which are subject to HM Treasury business case approval process since October 2023.

²⁶ [NHS \(2021\) How to produce a green plan: A three-year strategy towards net zero](#)

²⁷ [NHS England \(2022\) Delivering a ‘Net Zero’ National Health Service](#)

²⁸ [NHS \(2023\) NHS Net Zero Building Standard](#)

Mechanism that facilitates decarbonisation

The results and strategies of this framework are publicly declared enabling full transparency and accountability for the NHS. These measurements are gathered alongside the financial reporting mechanism and extrapolated for more difficult-to-provide measurements, reducing the reporting burden. The large purchasing power of the NHS is also utilised. In 2021 NHS England set out its NHS Net Zero Supplier Roadmap – the procurement requirements include that suppliers with contracts above £5 million per annum to publish a carbon reduction plan for UK Scope 1, 2 and a subset of Scope 3 emissions as a minimum²⁹ – generating environmental reporting and GHG reduction goals among key manufacturing suppliers, thus impacting sectors outside the NHS.

The accounting of GHG emissions enables costed and time-scaled strategies to be developed on a national scale. This can then be translated to local levels for them to develop their own plans and allocate specific and unique sources of high emissions, such as low carbon inhalers or primary care estates. This enables local regions to develop green plans in line with the national strategies.

Further tools and national guidance were also listed as currently under development in updated guidance “How to produce a Green Plan: A three-year strategy towards net zero”.³⁰ This guidance document is to support NHS trusts and integrated care systems in translating the national strategy to the local level.

Effectiveness in facilitating decarbonisation

The latest annual report and accounts for NHS England is from 2022-23³¹. The NHS calculated direct emissions of 4.55mtCO₂e for this reporting period. This is a 72% reduction in emissions from a 1990 baseline. This is ahead of their projected target of 5mtCO₂e. The NHS carbon footprint plus for this same period is 21.7mtCO₂e, a 36% reduction from the 1990 baseline.

Local government

Several tools and calculators are available for local authorities, some specifically designed for their use and others applicable to their needs. Many of these tools are relatively simple spreadsheets that apply methods similar to those used in SECR or other reporting schemes. These methods usually involve multiplying annual consumption figures by government-sourced emissions factors for relevant fuels or energy sources, or multiplying financial or product-based spending by corresponding factors.

While the ability of these tools alone to drive change is debatable, they can play a valuable role in supporting reporting, enabling repeated measurement, and encouraging improvement through the reporting process. It's important to note that as tools, rather than regulated emissions reporting schemes, these methods enable monitoring and reporting but do not

²⁹ [NHS \(2023\) Carbon reduction plan requirements for suppliers](#)

³⁰ [NHS \(2021\) How to produce a green plan: A three-year strategy towards net zero – updated guidance](#)

³¹ [NHS \(2024\) Annual report and accounts 2022 to 2023](#)

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define reporting Scopes. Therefore, the "Scope depth" image refers to the capabilities of the tools, not regulatory requirements.

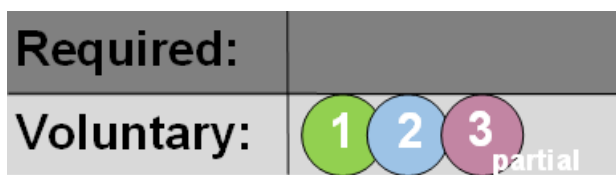
Local Partnership Greenhouse Gas Accounting Tool

Context of framework

The Local Partnerships Greenhouse Gas Accounting (LGA) Tool, a spreadsheet tool,³² provides a simple and consistent approach for councils in England and Wales to calculate their carbon footprint.

Scope depth

Figure 0-6: Scope depth of Local Partnership Greenhouse Gas Accounting Tool



The LGA tool covers Scope 1 and 2 emissions, including those from vehicles and fugitive gas leaks. While offering only partial coverage of Scope 3, it incorporates key aspects relevant to councils, such as transportation, mechanical biological treatment (MBT), composting, recycling, incineration (including energy from waste), and landfill. For more comprehensive measurement of waste related GHG emissions, a separate Waste Emissions Calculator is available.³³

Reporting requirements

This tool is optional for councils to use, meaning there are no mandatory reporting requirements. However, Local Partnerships currently offers benchmarking to councils who return completed tools.

Target depth

Since this tool focuses on GHG emissions accounting, it does not directly set targets. However, a separate climate adaptation toolkit is available for supporting councils in resilience and adaptation planning.³⁴

Mechanism that facilitates decarbonisation

Identifying key sources of emissions can enable change by helping to inform stakeholders and encourage intermediate steps, such as carbon budget setting and trajectory planning. However, this does not necessarily provide evidence of actual emissions reduction.

Alongside reporting and providing an accounting toolkit, Local Partnerships also provide a climate adaptation toolkit which can help councils prepare a strategy and action plan for

³² [Local Partnerships and Local Government Association \(2023\) Greenhouse Gas Accounting Tool FAQ](#)

³³ [Local Partnerships Waste Emissions Calculator](#)

³⁴ [Local Partnerships Resource Hub: Climate adaptation toolkit and NEW risk matrix](#)

climate adaptation. They therefore provide councils with quantitative measurements to assess the impact of any enacted plans and a tool to assist in developing plans.

Effectiveness in facilitating decarbonisation

Encouraging the intermediate steps such as carbon budgeting and trajectory planning does not necessarily provide evidence of actual emissions reduction. The Local Government Association (LGA) conducted a survey of climate change officers in all English councils in 2021. This achieved 178 responses (53% response rate). Their key messages were:³⁵

- Respondents valued the climate change support provided by the LGA and indicated a wide range of support in this area would be invaluable in the future.
- Most authorities measured their carbon emissions, regularly published carbon baselines and had established an official target for net zero or carbon neutrality.
- Most respondent authorities had agreed and up-to-date climate change strategies, executive climate change portfolio holders, and had climate-related risks embedded into their corporate risk registers.
- Respondent councils faced a range of challenges to enacting climate change action and securing the required resources and staff capacity to do so, including overall amount of funding, short-term funding cycles, and lack of clarity on goals or instructions for implementing successful climate change related projects.
- A large majority of respondent councils had experienced one or more climate-related incidents in the last five years, most frequently flooding but also including heatwaves, wildfires, storms and cold weather.
- Councils have implemented a wide range of measures to mitigate and adapt to changing climates, and are adapting to changing circumstances to deliver further climate related action in future.
- Councils have established a wide range of partnerships with other local authorities and other organisations to combat climate change.

In the 2022/23 impact report,³⁶ Local Partnerships report that over 300 councils have downloaded the GHG accounting tool (published in 2020) from the Local Partnerships website, the waste calculator (published in 2022) has been downloaded an additional 60 times and the climate adaptation toolkit (published in 2023) has been downloaded by 73 local authorities. However, this doesn't provide true information of the full uptake of the tool. An LGA survey from 2021 suggests 86% of local authorities report Scope 1 and 2 emissions with 54% reporting some Scope 3, and 19% of them use the provided tool.³⁷

Material provided alongside the Local Partnerships Greenhouse Gas Accounting tool states that the tool has “supported a number of local authorities in accurately identifying their main sources of emissions, and helping them to consider how certain interventions would impact on

³⁵ [Local Government Association \(2022\) Climate Change Survey 2021](#)

³⁶ [Local Partnerships 2022/2023 Impact Report](#)

³⁷ [Local Government Association Climate Change: Reporting guidance for local authorities](#)

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their emissions over a certain period. We have helped them set a carbon budget and plot a trajectory to net zero, and supported them in engaging with stakeholders. We produce a report that can be used as a key document in planning the reduction in emissions.”³⁸

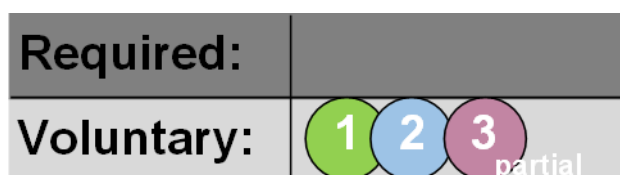
Setting City Area Targets and Trajectories for Emissions Reduction (SCATTER)

Context of framework

The SCATTER Cities tool,³⁹ is an online tool specifically designed for local authorities and represents a collaborative effort between Anthesis Group, Nottingham City Council, the Department for Energy Security and Net Zero (DESNZ) (formerly BEIS), the Greater Manchester Combined Authority, and the Tyndall Centre for Climate Research at the University of Manchester. Anthesis provides the tool, while funding comes from DESNZ through the Midlands Net Zero Hub, which has supported the SCATTER tool's development and future enhancements.

Scope depth

Figure 0-7: Scope depth of Setting City Area Targets and Trajectories for Emission Reduction tool



The SCATTER reporting system aligns with several frameworks, including the GHGP for Cities and the Global Covenant of Mayors Common Reporting Framework.⁴⁰ Unlike institutional reporting, SCATTER uses territorial boundaries instead of operational or financial control. Local governments can report to Carbon Disclosure Project (CDP) cities, regions and states framework based on SCATTER.

The GHGP for Cities defines boundaries as encompassing the entire city or territory. This means:

- Scope 1: Emissions directly generated within the city boundaries (e.g. fuel combustion, fugitive emissions).
- Scope 2: Emissions from grid-supplied electricity, heat, steam, and/or cooling consumed within the city boundaries.
- Scope 3: All other emissions outside the city boundaries resulting from activities within the city.

Scope 3 emissions are further broken down into sectors:

³⁸ [Local Partnerships and Local Government Association \(2023\) Greenhouse Gas Accounting Tool FAQ](#)

³⁹ [Setting City Area Targets and Trajectories for Emissions Reduction \(SCATTER\) Tool](#)

⁴⁰ [Global Covenant of Mayors for Climate and Energy \(2023\) Common Reporting Framework](#)

- Stationary energy (buildings, energy industries)
- Transportation
- Waste
- Industrial processes and product use
- Agriculture, forestry, and other land use
- Other sources outside the geographic boundary (collectively "other Scope 3")⁴¹

Reporting requirements

Local authorities are not required to use the SCATTER tool for reporting. However, it enables voluntary reporting to CDP as part of their emissions inventory, in line with the GHGP for cities.

Target depth

While targets aren't required or set, a separate tool called SCATTER Pathways can help generate future emissions scenarios. This tool allows users to adjust these scenarios using predefined intervention sets, potentially aiding councils and cities in developing plans with specific targets.

Mechanism that facilitates decarbonisation

The aim of SCATTER is to help local authorities identify the main sources of emissions in their area, which in turn helps areas and stakeholders to focus their interventions and reduce emissions effectively. Through the use of a standardised tool, SCATTER also enables local authorities to assess their GHG sources in a consistent and comparable way.

SCATTER Pathways is an addition to the SCATTER tool which offers guidance on local target setting and strategies for emission reduction. Its aim is to "model set emissions scenarios and compare them to local targets."

As the documentation states, "creating a greenhouse gas inventory for a local authority allows an organisation to identify the sources of their emissions and where to focus action." SCATTER Pathways' outputs are intended to facilitate engagement in developing collaborative low-carbon plans. These emissions strategies and targets can be provided to the public or other bodies requesting this information, increasing local authority accountability.

Effectiveness in facilitating decarbonisation

Similar to the Local Partnerships Greenhouse Gas Accounting Tool, the effectiveness of the SCATTER tool in driving real-world emission reduction remains unverified and requires further evaluation. It is worth noting that 50 UK local authorities, including City of Edinburgh (Scotland), are reported to use SCATTER to report to CDP under the GHGP for Cities.⁴²

⁴¹ [Greenhouse Gas Protocol \(2014\) Global Protocol for Community-Scale Greenhouse Gas Emission Inventories](#)

⁴² [SCATTER FAQ: Pathways](#)

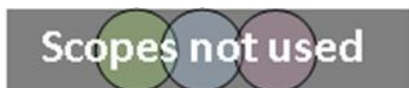
Impact Community Carbon Calculator

Context of framework

The Impact Community Carbon Calculator⁴³ was developed by Centre for Sustainable Energy and University of Exeter. The tool is free and designed to enable understanding of carbon emissions in local areas, with continuously updated datasets to estimate regional emissions. It utilises publicly available data sets, including the GHG reports provided by many of the frameworks in this report. With this data, regions can have GHG emissions ascribed to them and specified to sources of emissions, such as heating homes, using electricity, transport, producing and distributing food, and disposing of waste.

Scope depth

Figure 0-8: Scope depth of Impact Community Carbon Calculator



The Impact tool does not define emissions in terms of the GHGP Scopes. Project literature⁴⁴ highlights the relevance of the Scopes to organisations but suggests these are somewhat less relevant to geographical regions, hence defining them as not applicable in this case.

Reporting requirements

This is a tool which utilises data from pre-generated inventories and thus has no reporting requirements.

Target depth

This is a tool which does not provide targets. However, it can be used by cities and councils to help develop their own strategies and provide suggestions for climate action in the areas with highest emissions.

Mechanism that facilitates decarbonisation

Similar to SCATTER, the Impact tool helps regional areas identify the main sources of emissions in their area. This provides a basis for understanding local emissions and engaging with the local community for action on areas of large emissions.

The tool is primarily a data analysis tool; primary data collection is not included within it as established data sources are used. Data is gathered primarily from census information and national statistics data sources, as well as labour market data, transport data from BEIS (now DESNZ), and the National Atmospheric Emissions Inventory (as reported to by some organisations in Northern Ireland).

⁴³ [Impact community carbon calculator](#)

⁴⁴ [Centre for Sustainable Energy and University of Exeter \(2024\) Impact tool method paper](#)

Effectiveness in facilitating decarbonisation

Outputs from the Impact tool are not able to demonstrate a year-on-year change, and do not appear to include any sort of data verification method within the applied models. The tool is a computational model with no experimental data set to demonstrate conformity. This may present challenges in driving change since comparison and improvement over time is a key aspect of many theories of change.

As this tool is not a reporting framework it is difficult to assess its effectiveness in the same fashion as the other tools. However, Centre for Sustainable Energy states that the Impact tool has supported thousands of people and approximately 300 local councils in their climate action.⁴⁵ The tool has published community stories of how councils have used the tool to better understand and present the emissions data and inspire climate action.⁴⁶

Further local government tools

Several additional tools offer a specific focus and can be used alongside broader tools like those outlined earlier in this section. For instance, the WRATE tool⁴⁷, initially developed for the UK Environment Agency, is now commercially available through Golder Associates (part of WSP). This tool specifically focuses on waste, allowing users to calculate the environmental impact of waste collection and treatment.

Similar specialised tools exist in various fields. Tolvik⁴⁸ offers a free tool focused on emissions from energy from waste facilities. While this tool can support broader emissions reporting, it is important to note that regulated schemes govern most reporting requirements. Consequently, the detailed information this tool provides might not be suitable for official reporting and could be replaced by simpler assessments adhering to specific schemes.

Devolved government

This section examines frameworks that are specific to the devolved governments of Scotland, Wales and Northern Ireland.

Scotland

Context of framework

Reporting of carbon emissions within the Scottish public sector was made mandatory in 2015 under The Climate Change (Duties of Public Bodies: Reporting Requirements) (Scotland) Order 2015.⁴⁹ The Sustainable Scotland Network (SSN) is funded by Scottish Government to

⁴⁵ [Centre for Sustainable Energy: Impact community carbon calculator](#)

⁴⁶ [Impact community carbon calculator: Community stories](#)

⁴⁷ [Wrate](#)

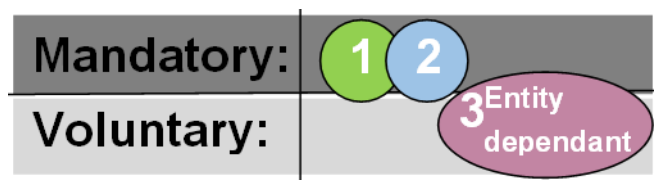
⁴⁸ [Tolvik Consulting](#)

⁴⁹ [The Climate Change \(Duties of Public Bodies: Reporting Requirements\) \(Scotland\) Order 2015](#)

administrate the annual reporting round. SSN produces annual guidance⁵⁰ and a template⁵¹ for reporting emissions within the public sector in Scotland. These reports are collected by the SSN which compiles a summary analysis. Further guidance for relevant organisations, resources and tools are available online to support compliance with Public Bodies Duties.⁵²

Scope depth

Figure 0-9: Scope depth of Scottish public bodies emissions reporting framework



Reporting of Scopes 1 and 2 emissions is required. For Scope 3 emissions, the guidance states “all relevant and significant areas of the organisation’s indirect emissions should be reported. Any categories 1% of overall emissions can be treated as de minimis”. Currently, public bodies are not required to report these but, where appropriate, land-based emissions should be considered for reporting.⁵³ The new statutory guidance is currently being drafted. Over time, it is expected that public bodies will report on Scope 3 as fully as possible. These categories are listed within the guidance and the expected levels of uncertainty for reporting data is provided.

Reporting requirements

Mandatory annual reporting was introduced from reporting year 2015/2016. Under the Climate Change (Scotland) Act 2009, Scotland has a national target of net zero by 2045; however targets at organisational level are set and reported upon by the individual public bodies. There are a range of target types, reported upon each year by SSN. The latest targets are given in “SSN Public Bodies climate change reporting 2021/2022: Analysis report”.⁵⁴

Scottish public bodies included in The Climate Change (Duties of Public Bodies: Reporting Requirements) (Scotland) Order 2015 are required to report annually on their GHG emissions. They include:

- Scottish Ministers
- Scottish Parliament
- Holders of office
- Local government
- National Health Service

⁵⁰ [Sustainable Scotland Network \(2023\) SSN Guidance on Public Bodies Climate Change Duties Annual Reporting 2022/23 Reporting Period](#)

⁵¹ [SSN Reports: Reporting resources](#)

⁵² [SSN Resources](#)

⁵³ [Scottish Government \(2021\) Public sector leadership on the global climate emergency: guidance](#)

⁵⁴ [Sustainable Scotland Network \(2023\) SSN Public Bodies Climate Change Reporting 2021/22: Analysis report](#)

- Educational institutions
- Police

A range of other public bodies which are required to report include research institutions and national parks, as stated within Schedule 1 Listed Bodies of the Reporting Order.⁵⁵

Organisations are also required to report on their validation processes. At a minimum, they are expected to have an internal validation process. Additionally, it is recommended that they engage in peer validation and, where appropriate, external third-party validations.

Organisations are requested to detail which sections have been peer-reviewed as part of their validation process.⁵⁶

Target depth

Scottish Government has committed to be net zero by 2045. Beyond this overarching national target, the responsibility for developing plans and lower-level targets belongs to the reporting body. In some cases, sector-wide targets and approaches have been developed and adopted, such as by NHS Scotland⁵⁷ and Scotland's colleges.⁵⁸ The reporting body must provide information on their plans for climate change, adaptation, governance and procurement.

Mechanism that facilitates decarbonisation

The Scottish public sector emissions reporting framework provides a template to enable consistent and comparable reporting of GHG emissions, targets, strategies, and verification procedures, with a section on wider impact. The reporting framework enables a centralised assessment of public sector emissions and identification of sources of emissions at the national level to help with policy making. Peer review of reporting is also suggested, which enables similar organisations to learn from each other. The overall result of the framework is one enabling accountability, transparency, bespoke self-generated targets, and strategy based on risk and opportunity assessments. GHG emissions reduction strategies can be reported against their previous iterations and adjusted appropriately. Additionally, a standardised spreadsheet tool enables consistent reporting and more quantitative data recording.

Effectiveness in facilitating decarbonisation

The SSN has published annual analysis reports on public bodies climate change reporting. The latest is from 2021/22⁵⁹, this report cites 100% compliance from all 188 public bodies mandated to report.

Emissions from Scopes 1 and 2 were 30.2% lower in 2021/22 as compared to 2015/16. However, this is a slight increase in emissions since the previous year (2020/21), which had seen an overall reduction of 32.6% between 2015/16 and 2020/21. The increase in emissions between 2020/21 and 2021/22 was attributed to expanded reporting metrics and a rebound in from the COVID-19 pandemic. Despite the rise in emissions as compared to 2020/21, 38,500

⁵⁵ [The Climate Change \(Duties of Public Bodies: Reporting Requirements\) \(Scotland\) Order 2015](#)

⁵⁶ [SSN Reports: Guidance – Part 6 Validation](#)

⁵⁷ [NHS Scotland climate emergency and sustainability strategy: 2022-2026](#)

⁵⁸ [EAUC Scottish climate emergency college statement](#)

⁵⁹ [Sustainable Scotland Network \(2023\) SSN Public Bodies Climate Change Reporting 2021/22: Analysis report](#)

tonnes of carbon savings have been identified and attributed to specific carbon reduction projects.

The analysis report also includes assessment of the targets set by each reporting body. 69% of reporting bodies reported setting one or more emissions reduction targets, with a total of 510 targets being reported from 131 reporting bodies. 66% of these reporting bodies completed an adaptation risk assessment during or prior to the 2021/22 reporting period. However, analysis of these reports demonstrated concerning progress with respect to adaptation risk assessments and actions, and the need for further training around this has been highlighted in the SSN report.

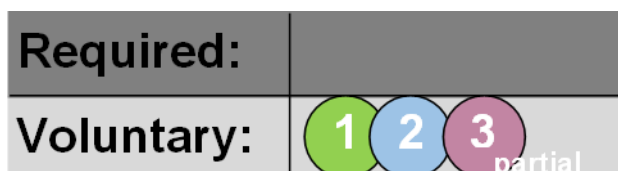
Wales

Context of framework

Welsh Government does not mandate reporting of GHG emissions by the public sector in Wales. However, Welsh Government provides a reporting guidance document⁶⁰ alongside a freely available reporting tool.⁶¹ They also suggest entities peer review related institutions' GHG reports before submission to Welsh Government, to increase consistency, transparency and effectively provide GHG emissions from all public sector bodies. These include central government bodies, NHS bodies, local authorities, higher education institutions, fire and rescue authorities, National Park Authorities, and other bodies designated by Welsh Government.

Scope depth

Figure 0-10: Scope depth of Welsh public bodies emissions reporting framework



While the Welsh public sector is not legally required to report GHG emissions, the provided tool facilitates standardised reporting across Scopes 1, 2, and four categories within Scope 3 with an additional focus on land use. The four categories within Scope 3 are the supply chain, waste, business travel and commuting and homeworking. Reporting within these Scopes is also catalogued into three data quality tiers with tier 3 being the highest quality as outlined in the guidance document. Each tier defines a different method of measurement, whereby tier 1 is an estimate, whilst tier 3 will be from a direct measurement.

Reporting requirements

There are no regulatory requirements for reporting GHG emissions in the Welsh public sector. However, the provided tool enables standardised reporting of Scopes 1, 2 and within Scope 3, the supply chain, waste, business travel, land use, and employee commuting and

⁶⁰ [Welsh Government \(2024\) Welsh public sector net zero carbon reporting guide](#)

⁶¹ [Welsh Government Net-zero carbon reporting spreadsheet](#)

homeworking. As part of transparency, skill sharing, consistency and increased uptake of this reporting, it is suggested that each report should be peer reviewed by a similar institution before submission.

Target depth

Welsh Government does not require public bodies to develop or report targets internally like the Scottish system. Similar to the UK government they have laid out centrally developed targets detailed within the “Net zero carbon status, by 2030 *A route map for decarbonisation across the Welsh public sector*.”⁶² Within the “Welsh Government Net Zero Strategic plan” they lay out an overarching science-based target to reduce total emissions in 2030 by at least 90% relative to the 2019/20 baseline.⁶³ The route map focuses on key areas of change in buildings, mobility and transport, supply chains and procurement, and land use.

Mechanism that facilitates decarbonisation

The Welsh Government carbon reporting framework provides an Excel tool for emissions reporting by all public sector bodies, enabling consistent and comparable emissions reporting.

Public sector recommendations for carbon reduction are generated from the reported data by Welsh Government. They use the data they collect as part of their evidence-based approach to making policy decisions as well as to track their decarbonisation progress.

Effectiveness in facilitating decarbonisation

Welsh Government has seen a reduction in their GHG emissions since 1990.⁶⁴ However, with the new baseline of 2019/20 just before the pandemic and only two years of public reporting available – and the very recent addition of other organisations such as FE and HE bodies to this reporting framework – it is difficult to assess whether they are meeting their reduction plans.

Despite no requirements to do so, GHG reporting is high, with all the 71 core public sector organisations submitting data for 2022/23. This is perhaps due to the relative ease of use of GHG reporting requirements. The template offered by Welsh Government to public bodies to report their GHG emissions is an amalgamation of different standards (but is primarily based on the GHGP) into one simple-to-use spreadsheet. This reporting document can therefore be used by all types of public sector organisations regardless of their size or their ability to measure emissions data and allows comparison of different sectors. Furthermore, Welsh Government have dedicated personnel to encourage and assist with the process of reporting.

⁶² [Welsh Government \(2021\) Welsh Government Net zero carbon status by 2030: A route map for decarbonisation across the Welsh public sector](#)

⁶³ [Welsh Government \(2022\) Net zero strategic plan](#)

⁶⁴ [Stats Wales: Emissions of greenhouse gases by year](#)

Northern Ireland

Context of framework

In March 2022, the Northern Ireland Assembly passed the Climate Change Act (NI) 2022,⁶⁵ committing the region to a target of net zero emissions by 2050. Under this act, Northern Ireland has a legal requirement to create and monitor a carbon budget. Work is ongoing with the Green Growth strategy and Climate Action Plan (CAP) in Northern Ireland, led by the Department of Agriculture and Rural Affairs (DAERA). DAERA published a draft Green Growth Strategy in 2021⁶⁶ and held a period of public consultation in December 2021. Under the NI Climate Change Act, DAERA are responsible for preparing and publishing the CAP, while all departments have a legal responsibility to supply sufficient policies and proposals.

Scope depth

Figure 0-11: Scope depth of Northern Ireland public bodies emissions reporting framework



Northern Ireland is currently in the process of improving its understanding of its emissions inventory, which is an estimate of territorial emissions in Northern Ireland and is reported on a production basis.⁶⁷ Examples of items within this inventory include emissions produced by cattle and heating government-owned buildings, and the emissions for each item are calculated using emissions factors. The inventory is produced for DESNZ at UK level and is led by Riccardo.⁶⁸

Reporting requirements

The public sector in Northern Ireland does not currently have the same level of public body reporting requirements as in Scotland and Wales, largely due to the lack of a devolved government since February 2022. However, since its government was restored in February 2024, it is expected that this position will change.⁶⁹

Target depth

Following advice from the Climate Change Committee (CCC), a net zero target and interim targets have been set. The policies to enshrine these targets in law are not yet in place, but the UK-wide 2050 net zero target applies to Northern Ireland as well as the rest of the UK. The CCC's original balanced pathway recommended an 82% reduction in emissions by 2050 from the base year⁷⁰; however, this has been superseded by legislation after the CCC updated their advice in March 2023, through a report that sets out their recommended pathway for Northern

⁶⁵ [Climate Change Act \(Northern Ireland\) 2022](#)

⁶⁶ [DAERA \(2021\) Consultation on the draft Green Growth Strategy for Northern Ireland](#)

⁶⁷ [National Atmospheric Emissions Inventory](#)

⁶⁸ [DESNZ \(2024\) 2022 UK Greenhouse Gas Emissions, Final Figures](#)

⁶⁹ [Minister Muir announces milestone in meeting Climate Change Act obligations](#)

⁷⁰ [Letter: Lord Deben, Climate Change Committee to Edwin Poots MLA](#)

Ireland to meet net zero.⁷¹ The same report sets out the interim targets of reducing emissions by 48% by 2030 and by 77% by 2040.

Mechanism that facilitates decarbonisation

One of the primary goals of measuring and reporting emissions in Northern Ireland is to provide robust evidence to shape policies that will reduce its emissions. This is particularly useful in explaining the rationale that influences political decisions to stakeholders who are impacted by them. This is a purpose that the data is currently being used for as Northern Ireland looks to reduce its agricultural emissions.

Northern Ireland recognises that its public bodies can set sound examples of reducing its emissions – by improving its buildings and decarbonising its fleet – that other public and private sector organisations can follow. The aim is that these types of actions will encourage similar behaviours by other organisations in the same sectors.

Effectiveness in facilitating decarbonisation

As work is still ongoing with CAP – including establishing a system of reporting against targets and carbon budgets – comments relating to their effectiveness cannot be made within this report.

UK Private sector

The UK government has two key legislated frameworks for the private sector: the Streamlined Energy and Carbon Reporting (SECR) framework, and the Energy Savings Opportunity Scheme (ESOS) framework.

Streamlined Energy and Carbon Reporting (SECR)

Context of framework

The Streamlined Energy and Carbon Reporting (SECR) framework, implemented in 2013 and updated in 2019, mandates energy and emissions reporting from UK companies listed on the Stock Exchange and certain other global markets ('quoted' companies), UK companies categorised as "large" under the Companies Act 2006, and large limited liability partnerships. This act defines a large company as one meeting at least two of the following criteria: a turnover of £36 million, balance sheet assets of £18 million, or having 250 or more employees.

⁷¹ [Climate Change Committee \(2023\) Advice report: The path to a Net Zero Northern Ireland](#)

Scope depth⁷²

Figure 0-12: Scope depth of Streamlined Energy and Carbon Reporting



Quoted companies must report their Scope 1 and 2 GHG emissions. Reporting of Scope 3 emissions are voluntary.

Unquoted large companies and limited liability partnerships must report their Scope 1 and 2 GHG emissions. It is also mandatory for them to report energy use and emissions from business travel. Other Scope 3 emissions reporting is voluntary.

Reporting requirements

Reporting bodies are mandated to provide SECR disclosures with their annual reports. These disclosures must be within the Directors’ Report filing or Energy and Carbon Report filing submitted to Companies House. A reporting template in the form of a Microsoft table in Annex H of “Environmental Reporting Guidelines: Including streamlined energy and carbon reporting guidance” is provided for reporting bodies to use. As of 2020, reporting of SECR was enabled for filing digital accounts with Companies House.⁷³

Those who must report are quoted companies, large unquoted companies (including charitable companies), and large limited liability partnerships as outlined above. The emissions data must be reported for the current and previous year (unless in first year of SECR reporting). Organisations must also provide the methodology used to calculate their emissions and provide information on any actions taken to reduce their GHG emissions. There is no statutory requirement to have their environmental information audited.

Once emissions are filed with Companies House it is unclear whether this data set is compiled or utilised in nationwide emissions monitoring, similar to public sector reporting. This information can be used to generate better emissions approximations as based upon the metrics provided by those filing within the SECR.

Target depth

SECR does not set specific targets for those required to report. However, it does require them to develop and report on any specific targets or strategies which they have developed to reduce their GHG emissions. A number of businesses in scope of SECR may also fall under TCFD requirements or be voluntarily signed up to SBTi.

⁷² [HM Government \(2019\) Environmental Reporting Guidelines: Including streamlined energy and carbon reporting guidance](#)

⁷³ [New digital tool enables easier energy and carbon reporting](#)

Mechanism that facilitates decarbonisation

SECR mandates which GHG emissions are reported, but the methodology used and the way this is presented in Directors' or Energy and Carbon Reports are not mandated. This provides companies filing with a quantifiable way to target and track emissions generated during operations. It aims to raise awareness of energy costs and improve visibility for key decision-makers. Public reporting within companies' annual reports enhances transparency for investors, which in turn could drive greater investment in the business. It also aims to balance the burden associated with energy and emissions reporting.

This supports the theory whereby impact is driven by first raising awareness of opportunities (such as areas of significant emissions), then by ensuring supporting information and practical support are available to simplify change. This theory is contingent on a desire for change, which in both SECR and ESOS is largely underpinned by financial motivation.

Effectiveness in facilitating decarbonisation

The Financial Reporting Council conducted its latest review of SECR in 2021.⁷⁴ The limited scope of reporting and the lack of a tool to ensure consistent reporting can also make comparability difficult. However, the review provides valuable insights into implementation practices.

The review assessed 27 SECR reports. While all entities disclosed their emissions, inconsistencies were identified:

- **Energy use:** Two entities omitted the required energy use disclosures.
- **Emissions breakdown:** Two entities reported a combined figure instead of separate subtotals for Scope 1 and 2 emissions.
- **Geographic reporting:** Two quoted companies failed to report the proportion of emissions and energy use within the UK and offshore areas.
- **Emissions reporting unit:** Two entities reported emissions only in carbon dioxide (CO₂) instead of the required carbon dioxide equivalent (CO₂e) encompassing all six relevant greenhouse gases.

Some benefits were also observed, which are largely in line with the suggested theories of change:

- **Emissions reduction strategies:** An undisclosed number of entities linked their reports to emissions reduction strategies, including long-term and interim targets, progress updates, and emissions included in "net zero" commitments.
- **Verification:** Ten entities disclosed some form of third-party verification, although only seven provided sufficient evidence to verify the audit process.
- **Voluntary disclosures:** Several reports included voluntary disclosures beyond the mandatory requirements. The most frequent examples, encouraged by the guidelines,

⁷⁴ [Financial Reporting Council \(2021\) Thematic Review: Streamlined Energy and Carbon Reporting](#)

were Scope 3 emissions (11 reports), renewable energy usage (eight reports), market-based emissions (five reports).

- **Emissions targets:** 12 reports included emissions reduction targets for absolute emissions or intensity metrics. Five others expressed plans to set targets in the future.
- **Emissions ratios:** All entities in the sample disclosed at least one emissions ratio, and eight disclosed two or more.
- **Alignment with TCFD (now subsumed by IFRS SDSs):** Ten reports aligned their disclosures with the Taskforce on Climate-related Financial Disclosures (TCFD) recommendations. Seven others stated their intention to adopt this framework in the future.

A post-implementation review of the current SECR framework is scheduled for 2024.⁷⁵ DESNZ ran a call for evidence between October and December 2023 to seek views on the current SECR framework for informing the review.⁷⁶

Energy Saving Opportunity Scheme (ESOS)

Context of framework

The Energy Saving Opportunity Scheme (ESOS) was introduced in 2014 to address a finding of the 2012 UK Energy Efficiency Strategy, which surmised that lack of information was a key barrier to the uptake of energy efficiency measures by business. As of 2024 ESOS entered a third compliance period, following a previous adjustment to the scheme in 2019.⁷⁷

Scope depth

Figure 0-13: Scope depth of Energy Saving Opportunity Scheme

Mandatory:	
Voluntary:	

ESOS does not strictly utilise the GHGP Scope system, however there are similarities which enable comparison. ESOS requires gathering and reporting information on energy usage, both fuel and electricity. With the exclusion of fugitive gases, this encapsulates Scope 1 under fuel and Scope 2 under electricity. This information does not need to be converted to GHG emissions as it would under a standard approach to Scopes. Emissions falling under Scope 3 such as upstream or downstream emissions are not included. This means certain emissions do not require full reporting of all energy use. Another set of exceptions are also left unreported.

⁷⁵ [HM Government \(2019\) Environmental Reporting Guidelines: Including streamlined energy and carbon reporting guidance](#)

⁷⁶ [UK greenhouse gas emissions reporting: Scope 3 emissions](#)

⁷⁷ [Comply with the Energy Savings Opportunity Scheme \(ESOS\): phase 3](#)

Energy usage not in scope of ESOS is as follows:

- Unconsumed energy that an eligible organisation does not use and supplies to a third party.
- Energy consumed outside the UK.
- Energy consumed for international travel or shipping where the journey does not start or end in the UK (unless the organisation wishes to include their international travel).
- Energy used in flares at petrochemical works.

Reporting requirements

ESOS requires reporting of energy-related usage by industries which have an annual turnover exceeding £44 million and an annual balance sheet total exceeding £38 million, or employ 250 or more people, regardless of working hours and domicile. The threshold is set at the corporate group level, whereby if one business within the corporate group meets the threshold, the whole group (including SMEs within the group) is required to report under one ESOS notification. ESOS has currently entered Phase 3 with additional changes and requirements as compared to the previous phases, and the government has committed to further changes for Phase 4.

Eligible organisations under ESOS report on their energy and fuel consumption, not directly in GHG emissions. While ESOS data can be used to estimate Scope 1 and 2 emissions (excluding fugitives), these calculations are not mandatory. Instead, organisations report an energy intensity ratio using metrics like energy consumption per unit floor area, production output, or passenger miles. They are also required to report on energy saving options identified and actions they have taken to save energy. Additionally, they must submit an ESOS compliance notification through the online system.

Filing companies also provide an annual report with a time-scaled action plan and progress updates. These updates detail the implemented and unimplemented actions from the previous plan, along with implementation dates and estimated/actual energy savings for completed actions (including data sources) and a combined estimated total energy savings from all implemented actions.

In place of producing an ESOS report, companies can also demonstrate compliance through alternative routes such as ISO 50001, Display Energy Certificates, and Green Deal Assessments.⁷⁸

Target depth

While ESOS doesn't set specific targets, it does emphasise energy consumption and efficiency through various requirements. Organisations participating in ESOS must:

- Measure their total energy consumption to understand overall usage patterns.

⁷⁸ [BEIS \(2017\) Evaluation of the Energy Savings Opportunity Scheme: Interim process and early impact evaluation report](#)

- Calculate energy intensity ratios using metrics like energy consumed per unit floor area or production output, allowing comparison across different organisations or activities.
- Identify areas of significant energy consumption to prioritise their efforts for maximum impact.
- Appoint a lead assessor with the necessary expertise to oversee these tasks, with exceptions granted in specific cases.
- Conduct energy audits on identified areas of significant energy consumption to delve deeper into opportunities for improvement.

Furthermore, organisations are required to create an action plan outlining their strategies for reducing energy consumption. This plan should address the following key points:

- Specific actions planned to reduce energy consumption.
- Targeted timelines for implementing each action.
- Origin of recommendations – whether the action stems from the ESOS assessment or other sources.
- Projected energy savings expected over the four-year compliance period.
- Methodology used to estimate these energy savings.

By implementing these requirements, ESOS aims to encourage participating organisations to actively assess and improve their energy efficiency, ultimately contributing to overall energy savings and environmental benefits.

Mechanism that facilitates decarbonisation

ESOS aims to provide large energy users information on tailored and cost-effective actions they can take to save energy. Information collected on how much energy an organisation uses is primarily for the purpose of ensuring that all energy use is covered in the energy audit, which is also a main focus of the scheme.

The scheme collects and publishes data from reporting organisation on energy-saving actions that have been identified, how much energy these actions could save, and whether they have been implemented, with the aim of encouraging organisations to take the actions identified. The new action plan function encourages organisations to make a public commitment to save energy and report against their progress. This aims to move participants from information to action, whilst not actually making taking action a legal requirement.

Effectiveness in facilitating decarbonisation

The success of the ESOS scheme was evaluated by Ipsos MORI and University College London (UCL) on behalf of the Department for Energy and Climate Change (DECC) in April 2015, and published by BEIS in 2017.⁷⁹ This evaluation reported high levels of awareness, and that capacity and cost to users was as expected prior to the scheme launch. Furthermore, the

⁷⁹ [BEIS \(2017\) Evaluation of the Energy Savings Opportunity Scheme: Interim process and early impact evaluation report](#)

evaluation reported that information provided to organisations was believed to be of a satisfactory standard.

Of most interest to this report, ESOS was reported as an influence on around a third of participating organisations who made energy-related improvements, and on around a fifth of those who made fuel efficiency improvements. This suggests that the introduction of ESOS may have at least partially driven change in these organisations. However, the same evaluation highlighted that organisations required to participate in other energy efficiency policies were less likely to identify an increase in interest in energy efficiency due directly to ESOS. A subsequent further review⁸⁰ found even greater levels of influence of the ESOS scheme; however the focus of the review and reporting was on financial savings, energy and fuel savings, not necessarily on GHG emission reduction.

This latest review suggests:

- 38% of energy and 32% of fuel efficiency measures implemented or planned were attributed to ESOS, with lighting and process improvements most common.
- ESOS is estimated to have driven 1.65 TWh, 1.51 TWh, and 0.52 TWh of savings in buildings, industrial processes, and fuel efficiency, respectively.
- 37% of organisations reported cost savings, and some reported wider benefits like improved productivity and reputation.
- However, impact is limited in organisations with existing good energy management practices.

While only a minority of organisations reported improvements or savings directly attributable to ESOS, it's important to recognise that ESOS operates within a broader context of other regulatory frameworks. Moreover, compared to SECR, ESOS has less stringent requirements for data collection and processing. This focus on energy also means ESOS offers less potential for broader GHG reduction strategies. However, the government has committed to strengthening ESOS framework by including GHG emissions within ESOS audits and reporting from Phase 4.

International Private sector

International private sector frameworks were also reviewed to provide a comprehensive view of the different emissions reporting approaches within the UK and surrounding economic region – generating insights into best practices, common challenges, and potential areas for improvement that could be relevant to the public sector emissions reporting.

⁸⁰ [BEIS \(2020\) Research on energy audits and reporting, including the Energy Savings Opportunity Scheme \(ESOS\): Phase 2 final report](#)

International Financial Reporting Standards Foundation Sustainability Disclosure Standards (IFRS SDS)

Context of framework

The International Financial Reporting Standards (IFRS) Foundation hosts two standard setting boards:

- The International Accounting Standards Board (IASB), which issues IFRS Accounting Standards,
- The International Sustainability Standards Board (ISSB), which issues IFRS Sustainability Disclosure Standards (IFRS SDS).

The ISSB is an independent standard-setting board established in 2021 under the IFRS Foundation, with the aim of developing a global baseline of sustainability-related financial reporting standards to meet investors' needs for sustainability reporting. In June 2023, the ISSB issued two IFRS SDS:

- IFRS S1 General Requirements for Disclosure of Sustainability-related Financial Information which sets out the broad principles and requirements for sustainability disclosures, including materiality, governance, stakeholder engagement, and reporting frequency, and disclosure obligations to be met where no topic-specific standard exists.⁸¹
- IFRS S2 Climate-related Disclosures focuses specifically on climate-related risks and opportunities, building on the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD).⁸²

The ISSB builds on the work of investor-focused reporting initiatives – such as Climate Disclosure Standards Board (CDSB), Sustainability Accounting Standards Board (SASB), and the TCFD – which are all now consolidated into the IFRS Foundation.⁸³ The first set of standards, IFRS S1 and S2, seek to provide scalable standards which can be used by a wide range of entities.

Scope depth

Figure 0-14: Scope depth of International Financial Reporting Standards Foundation Sustainability Disclosure Standards



⁸¹ [IFRS S1 General Requirements for Disclosure of Sustainability-related Financial Information](#)

⁸² [IFRS S2 Climate-related Disclosures](#)

⁸³ [International Sustainability Standards Board](#)

IFRS SDS will only create mandatory reporting requirements if jurisdictions introduce reporting obligations against the standards. The standards do not have legislative force on their own.

The reporting framework includes requirements for Scope 1, 2 and 3 but also requires, reporting in respect of governance, strategy, risks and risk management, and metrics and targets. GHG reporting forms part of the cross-industry metrics set out in the standard.⁸⁴

Reporting requirements

IFRS S1 requires disclosure of material information about all sustainability-related risks and opportunities. Key steps in compliance with IFRS S1 are the identification of sustainability-related risks and opportunities, and the identification of applicable disclosure requirements. The standard sets out sources which should or could be used to inform the former. These include the SASB standards, the Climate Disclosure Standards Board (CDSB) Framework Application guidance for water and biodiversity disclosures. Identification of disclosure requirements relevant to the identified risks and opportunities is undertaken by first applying ISSB standards, then considering SASB standards, any relevant CDSB Framework Application guidance, and Global Reporting Initiative (GRI) or European Sustainability Reporting standards.

IFRS S2 requires the disclosure of emissions, as well as scenario analysis and (where applicable) transition plans and (net) zero targets. Emissions are to be reported in tonnes of CO₂e, and ISSB guidance⁸⁵ states that “Emissions must be measured in accordance with the GHGP Corporate Standard unless a jurisdiction requires a company to use a different approach to measurement. A company is required to provide information about Scope 1, Scope 2 and Scope 3 GHG emissions. The requirement to disclose Scope 3 GHG emissions reflects the importance of providing information related to a company’s value chain, to more fully inform investors’ understanding of a company’s exposure to transition risk. A company must consider the 15 categories of Scope 3 GHG emissions set out in the GHGP Corporate Value Chain (Scope 3) Standard, with information being disclosed when material, and provide disaggregated information about its Scope 3 GHG emissions when material.”

Target depth

The IFRS SDS does not set targets for reporting bodies; however, it requires disclosure of transition plans and targets, climate resilience and industry-specific materials alongside GHG emissions.

Mechanism that facilitates decarbonisation

IFRS SDS aims to build transparency, integrity and accountability, use of the standards should positively enable access to capital, improve the business reputation and stakeholder engagement. The standards also encourage organisations to understand the potential climate risks and opportunities.

⁸⁴ [Introduction to ISSB and IFRS Sustainability Disclosure](#)

⁸⁵ [IFRS \(2023\) ISSB guidance document on IFRS S1 and S2 standards](#)

Effectiveness in facilitating decarbonisation

It is difficult to assess the effectiveness of the IFRS SDS as they have only been introduced for use in 2024. However, it should be noted that the main purpose of IFRS SDS is to provide transparency around sustainability-related risks and opportunities of an entity.

EU's Corporate Sustainability Reporting Directive (CSRD)

Context of framework

The Corporate Sustainability Reporting Directive (CSRD) is a new EU directive that updates the existing Non-Financial Reporting Directive (NFRD).⁸⁶ The CSRD will implement the European Sustainability Reporting Standards (ESRS)⁸⁷ – developed by the European Financial Reporting Advisory Group (EFRAG) – in a phased approach, gradually expanding the number of companies that are required to report over several years. The CSRD is interoperable with IFRS S1 and S2 sustainability standards; it goes further than IFRS SDS by requiring reporting through both a financial materiality lens and an impact reporting lens, and includes detailed standards across a range of environmental, social and governance topics.

Scope depth

Figure 0-15: Scope depth of EU's Corporate Sustainability Reporting Directive



Companies subject to this directive must report on Scope 1, 2, and material Scope 3 emissions. If unable to report on a specific category of Scope 3 emissions that is deemed material, companies must provide a clear explanation and develop plans to improve their reporting capabilities. This includes initiating systems to record and report these emissions within a designated transition period. The goal is to achieve reporting of all material Scope 3 emissions by the end of a designated transition period.⁸⁸

The CSRD does not provide a specific tool or portal for calculating and reporting CO₂e emissions. Instead, these calculations must be performed by a verifiable third party to ensure accuracy and independence.

Reporting requirements

The CSRD, implemented in phases, requires EU-based enterprises to file annual reports. The compliance timeline is as outlined below:⁸⁹

⁸⁶ [Corporate Sustainability Reporting Directive \(CSRD\) explained](#)

⁸⁷ [The first set of ESRS – the journey from PTF to delegated act \(adopted on 31 July 2023\)](#)

⁸⁸ [The first set of ESRS – the journey from PTF to delegated act \(adopted on 31 July 2023\)](#)

⁸⁹ [European Commission: Corporate sustainability reporting](#)

- Companies already reporting under the NFRD to start reporting for 2024 fiscal year for publication in 2025.
- Large EU registered companies not previously subject to NFRD to start reporting for 2025 fiscal year for publication in 2026.
- SMEs listed on EU markets meeting two of the following criteria to start reporting for 2026 fiscal year, for publication between 2027 and 2029.
 - >250 employees
 - Turnover of > €40 million
 - Assets of > €20 million
- Non-EU entities with significant EU operations to start reporting for 2028 fiscal year for publication in 2029.

ESRSs aim to provide both information to investors (financial materiality) and information to society (impact materiality). Companies must report across environment, social, and governance matters (ESG). Within the environmental category, disclosures are required around five key areas: climate change, pollution, water and marine resources, biodiversity and ecosystems, and finally, resource use and circular economy.

Additional details on the methodology for developing or identifying these requirements – such as using scenario-based strategy formation – can be found in ESRS E1.

Target depth

While the CSRD itself doesn't set specific targets for entities, it requires companies to develop strategies and targets that are aligned to limiting global warming to 1.5°C, and describe the scenario analysis used to develop them. The targets must be accompanied by action plans, disclosed resource allocation, and metrics to monitor their implementation. This should eventually be complemented by the Corporate Sustainability Due Diligence Directive (CSDDD).

Mechanism that facilitates decarbonisation

CSRD reporting requirements aim to enable reporting companies to understand material environmental impacts, actions taken, the results of those actions, and the material risks and opportunities related to the environment. The CSRD mandates relevant companies to report not only their carbon emissions but also their wider environmental impact and plans to address these issues. IFRS SDS and ESRS are interoperable, but ESRS goes further than IFRS SDS, requiring reporting to be on a 'double materiality'. The impact materiality reporting is arguably more relevant to decarbonisation than financial materiality reporting.

Materiality

Under IFRS SDS, materiality is defined as follows:⁹⁰

⁹⁰ [IFRS SDS \(2023\) General Requirements for Disclosure of Sustainability-related Financial Information](#)

“In the context of sustainability-related financial disclosures, information is material if omitting, misstating or obscuring that information could reasonably be expected to influence decisions that primary users of general-purpose financial reports make on the basis of those reports, which include financial statements and sustainability-related financial disclosures and which provide information about a specific reporting entity.”

Double materiality

Under EU’s CSRD, it goes further by requiring reporting based on double materiality, i.e. covers both impact and financial materiality, whereby organisations must disclose information that is material from a financial perspective, as well as its impacts on people and/or the environment.⁹¹

Effectiveness in facilitating decarbonisation

It is difficult to assess the CSRD's effectiveness at this early stage of implementation. However, the policy is far-reaching and compels entities to publicly disclose their climate policies. This creates public accountability and provides a level playing field for investors, allowing them to accurately develop ESG markets and target investments towards low-climate-impact companies. While the reporting burden is the most extensive among existing frameworks, the phased approach is intended to mitigate implementation challenges as the policy and market evolve.

Carbon Border Adjustment Mechanism

EU Carbon Border Adjustment Mechanism

Context of framework

The Carbon Border Adjustment Mechanism (CBAM) is a framework implemented by the EU.⁹² The objective of CBAM is to assign an equivalent carbon price to carbon emissions (described by the European Commission as a “fair price on carbon emitted”) associated with the production of carbon intensive goods that enters the EU. The EU CBAM entered application on 1st October 2023, with the first reporting period for importers ending 31st January 2024.⁹³ Importers of cement, aluminium, fertilisers, iron and steel, hydrogen and electricity must register with national authorities and purchase CBAM certificates. The CBAM certificates are priced weekly based upon the European trading system’s (ETS) allowances.

⁹¹ [EFRAG \(2023\) Draft EFRAG IG1: Materiality assessment implementation guidance](#)

⁹² [European Commission: Carbon Border Adjustment Mechanism](#)

⁹³ [European Commission: Carbon Border Adjustment Mechanism – Legislative Documents](#)

Scope depth

Figure 0-16: Scope depth of EU Carbon Boarder Adjustment Mechanism



GHG emissions must be reported based on an assessment of the production process, considering both the material's quality and quantity. For complex goods where precursor materials are involved, the emissions of those precursors must also be reported. Clinker, used in cement production, is an example of such a precursor.

Reporting requirements

The reporting requirements involve three categories of emissions: embedded (indirect), direct, and precursor. Importers must report the quantity, quality, and emissions (direct, indirect embedded, and effective carbon price due) for specified goods like cement, aluminium, fertilisers, iron and steel, hydrogen, and electricity.

For direct and indirect emissions, reporting follows a production route with predefined processes to calculate embedded carbon based on the quantity and quality of the imported product. For "complex goods" with associated embedded emissions in precursor goods, the quantity of GHG emitted from the precursors must also be reported.

The "effective carbon price" is the assigned price per tonne of CO₂e, coming into effect after the transitional period until 2026. This price can be based on an ETS or a tax, levy, or fee. Importers must also report the effective carbon price for the import.

During the transition phase, quarterly reports are required on the transitional registry. A voluntary reporting template is also available. Webinars, information sessions, and e-learning modules are offered for each product category. Completed reports should be submitted to each nation's "national competent authority."

Reports can be generated and submitted utilising an Excel tool⁹⁴ or a portal⁹⁵ which are explained in guides and e-learning systems.⁹⁶

Target depth

The CBAM does not set emission reduction targets for importers. However, following the transitional phase, a levy linked to the EU's carbon market price will be applied to imports. The EU also aims to expand the list of goods covered under this framework to encompass over

⁹⁴ [CBAM Excel tool](#)

⁹⁵ [CBAM portal](#)

⁹⁶ [CBAM training catalogue](#)

50% of emissions from sectors included in the EU ETS. The UK has also confirmed its intention to implement a similar system by 2027.⁹⁷

Mechanism that facilitates decarbonisation

The EU CBAM, designed to tackle carbon leakage, a phenomenon where stricter environmental regulations in one region can incentivise production to shift to less regulated regions, leading to "asymmetric competition" with unfairly priced or unreported carbon emissions. The EU CBAM controls access to the EU import market by requiring standardised accounting of GHG emissions, seeking to level the playing field and reduce carbon leakage.

Effectiveness in facilitating decarbonisation

Due to its recent implementation in 2023, assessing the effectiveness of the EU CBAM in tackling carbon leakage is challenging. Until 2026, the policy will primarily focus on collecting GHG data and potentially refine its reporting structure if needed. Only after the introduction of a carbon price in 2026 can its impact in limiting carbon leakages be assessed.

UK Carbon Border Adjustment Mechanism

Context of framework

In 2023, the UK confirmed implementing a UK CBAM by 2027, applying it to specific goods.⁹⁸ It aims to adjust the CBAM liability for goods imported from countries with an explicit carbon price. Unlike the EU CBAM, electricity imports are not included. However, the UK system adds ceramics and glass to products covered under the EU CBAM list of sectors.

Scope depth

Figure 0-17: Scope depth of UK Carbon Boarder Adjustment Mechanism



The UK CBAM will apply to Scope 1, Scope 2, and selected precursor product emissions embedded in imported products, to ensure comparable coverage with the UK Emissions Trading Scheme.

Reporting requirements

Importers of aluminium, cement, ceramics, fertiliser, glass, hydrogen, iron, and steel sectors must report embedded Scope 1, 2, and any selected embedded emissions from precursor goods. The design and delivery of the UK CBAM will undergo further consultation in 2024.

⁹⁷ [Factsheet: UK Carbon Border Adjustment Mechanism](#)

⁹⁸ [Factsheet: UK Carbon Border Adjustment Mechanism](#)

Target depth

Similar to the EU CBAM, the UK CBAM doesn't establish targets for producers to modify their GHG emissions. Instead, it will impose a cost reflecting the embedded carbon footprint of the imported goods.

Mechanism that facilitates decarbonisation

The UK CBAM is similar to the EU CBAM, with an aim to address carbon leakage and ensure a fair carbon price for certain imported goods. This mechanism will act as a barrier for entry to the UK market; however, transparent emissions reporting and potential carbon cost payments will ultimately enable access.

Effectiveness in facilitating decarbonisation

The UK CBAM is still under development and will only be implemented in 2026. However, the recently enacted EU CBAM, designed with similar goals, can offer valuable insights to the effectiveness of this approach to mitigating carbon leakages.

Commercial standards

This section looks at commercial standards for measuring GHG emissions. These are standards privately developed and utilised within industry in place of government regulations. These have been included as they are commonplace amongst organisations wishing to demonstrate a green agenda in a transparent and standardised fashion.

International Organisation for Standardisation

The International Organisation for Standardisation (ISO) sets standards for products, processes, systems and testing. ISO standards can be used by organisations to support external reporting and disclosure. ISO, and the national standards bodies that it works with, generally charge for the standards that they publish. ISO standards include those on Energy Management Systems, energy efficiency, GHG reporting and product carbon footprinting. Within this report the standards on GHG reporting and energy management have been reviewed due to their close relation to many of the previously presented frameworks.

ISO TC207 Greenhouse gas and climate change management

Context of framework

The ISO climate change standards⁹⁹ help organisations determine their GHG emissions and their associated environmental impacts, as well as setting standards for validating and verifying performance. They include ISO 14064 (Greenhouse gases), where Part 1 to 3 provide

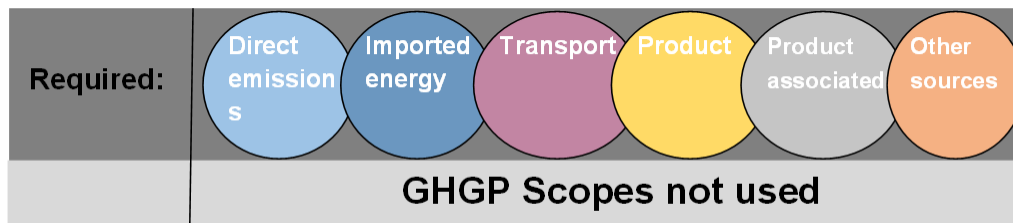
⁹⁹ [ISO/TC 207/SC 7: Greenhouse gas and climate change management and related activities](#)

guidance on quantification and reporting of GHG emissions and removals at the organisation and project level, and verification and validation of GHG statements. Furthermore, requirements for bodies that validate and verify environmental information are also outlined in ISO 14065 and 14066.

Companies typically choose to report under either ISO 14064-1 or 14067 (Carbon footprint of products) and additionally 14068 (Climate change management) introduced in 2023. These series of standards provide requirements and guidance for establishing the GHG emissions baseline, developing mitigation strategies, and communicating performance. Organisations may choose to have their GHG emissions verified and validated by first-, second- and/or third-party, using the process described within ISO 14064-3. For third party verifiers, ISO 14065 and 14066 set requirements for undertaking this in a competent way.

Scope depth

Figure 0-18: Scope depth of ISO TC207 Greenhouse gas and climate change management standard



While the description of GHG emissions via three Scopes is based upon the GHGP which the majority of reporting standards follow, under ISO 14064-1, 14064-2, 14064-3, and 14067 standards, all emission sources and removals are reported under six categories. These categories describe direct and indirect emissions from energy use, transportation, products, product use, and other sources. These categories must be reported upon within the boundaries related to the organisation's activities. All relevant activities related to these categories must be compiled, and their GHG emissions calculated.

ISO 14064-1, 14064-2, and 14067 define boundaries for organisations, projects, and products, respectively, with ISO 14064-2 focusing on projects designed to reduce GHG emissions. Adjustment of operational boundaries is not unique to the ISO system as the GHGP also has protocols for cities, institutions, projects and products amongst others.

Reporting requirements

The report structure is left to the reporting organisation, but the report must contain information related to GHG emissions under the chosen level of detail and categories defined within the standard. Under ISO 14064-1, organisations are suggested to report on their GHG emissions reduction strategies and actions. ISO 14064-2 requires reporting on a GHG project which generates carbon credits. ISO 14067 focuses on the GHG emissions of a product or service throughout its life cycle stages. A generic product life cycle can range from resource extraction to end of life, with reporting requirements aligned with this boundary. A new standard ISO 14068 was introduced last year which builds upon ISO 14067 and 14064. The standard is

designed to enable organisations achieve and claim carbon neutrality status. Verification and validation of GHG reports are optional and can be made mandatory by the organisation, GHG programme, legal, and other interested parties. If verification and validation are required, ISO 14064-3 is to be followed.

Target depth

Targets are not required to be set within the ISO 14060 standards; however they are recommended. Assessment of the reported targets may be specified by the organisation, GHG programme, legal, and other interested parties.

Mechanism that facilitates decarbonisation

Organisations voluntarily report under ISO standards to follow best practices and demonstrate credibility. Companies can pay for verification and adherence to these standards, ensuring transparent and consistent quantification of their GHG emissions and removals.

The benefits of reporting under this framework include:

- Enhanced environmental integrity: Reporting promotes transparent and accurate GHG quantification, leading to increased trust and credibility.
- Effective GHG management: The framework helps companies develop and implement effective strategies to manage their GHG sources.
- Emission reduction and mitigation: Tracking emissions allows companies to identify opportunities for reduction and mitigation, enabling them to address their climate impact.
- Risk management: Reporting under ISO standards can help companies manage climate-related risks more effectively.
- Market access and investment: Compliance can facilitate access to carbon markets and potential green investments.
- Reduced regulatory burden: Reporting under these frameworks may alleviate the need for additional government-mandated reporting requirements.

Effectiveness in facilitating decarbonisation

While information is currently limited to assess the direct impact of the ISO 14060 standards on organisations, a survey conducted by Antaris Consulting between 2012 and 2013 provides insights into the adoption rate of related reporting standards in the UK.¹⁰⁰ The study identified a 4% overall rise in organisations adopting reporting standards during that period. Notably, a significant increase of 116% was observed for ISO 50001, which relates to energy management and can be used as an alternative to ESOS reporting. The survey did not cover the ISO 14060 family, which specifically addresses GHG emissions, as it was only introduced in the year the survey was conducted.

¹⁰⁰ [Antaris: UK Growth in the uptake of ISO standards – ISO survey](#)

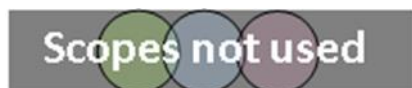
ISO 50001 Energy management

Context of framework

The ISO 50001 energy management standard was introduced in 2011, with the latest update occurring in 2018.¹⁰¹ Also mentioned within the ESOS section, ISO 50001 can be used as a compliance route for ESOS.

Scope depth

Figure 0-19: Scope depth of ISO 50001 Energy management standard



ISO 50001 is an energy management standard and does not follow the GHGP. The values companies are required to identify and provide include energy usage statements, an energy performance indicator, and the establishment of an energy baseline.

Reporting requirements

Beyond accurately recording and reporting energy usage information, organisations must also develop and report policies outlining their commitment to more efficient energy use. Based on these policies, they must set targets and objectives to improve their energy efficiency. These decisions should be informed by collected and analysed data, and organisations should continuously measure their energy efficiency strategy and take actions to improve it.

Target depth

While the ISO 50001 standard does not set specific targets, it does require organisations to generate policies, plans, and actions in line with the collected and reported data, with the goal of continuously improving energy management.

Mechanism that facilitates decarbonisation

This reporting framework requires the identification of opportunities for energy efficiency improvements through the development of a strategy based on recorded energy data and calculations. Public ISO certification and authentication can also hold reporting bodies accountable for their declarations. Previously, ISO 50001 certification allowed those reporting to be exempt from ESOS reporting, thus reducing the regulatory burden.

Effectiveness in facilitating decarbonisation

Information on the effectiveness of ISO 50001 is not readily available. However, a survey conducted over 2012-2013 by Antaris Consulting illustrated that uptake had increased by 116%.

¹⁰¹ [ISO 50001: 2018 Energy management systems – Requirements with guidance for use](#)

Conclusions

GHG emissions reporting approaches from sixteen frameworks were reviewed and evaluated, including nine public sector frameworks and seven private sector frameworks (two national and five international). This review found that there are a number of different ways to approach emissions reporting. Of the frameworks reviewed, twelve utilise the GHGP to define boundaries and emission categories, and four frameworks employ alternative but similar methods for emissions accounting. Among the twelve frameworks reporting based on GHGP scopes, five have some form of mandatory reporting. For most frameworks, their requirements mainly focus on defining the boundaries – i.e. what should be measured and reported – but do not provide details on what methods to be used for measurement.

Through analysis of the frameworks, it has become apparent that they have not always been designed with one clear mechanism to support decarbonisation in mind. Due to the infancy of some of the frameworks and the general lack of information, there is limited evidence within this desk review to indicate how effective the frameworks are in achieving the objectives that they set out to achieve. The key mechanisms which the reporting frameworks enable change and their effectiveness in driving decarbonisation were further explored through expert interviews. The combined findings from both systematic review and expert interviews are discussed in more detail within the main report.

Finally, through the systematic review, a reporting and measurement pathway categorisation schematic has been developed. The schematic illustrates the categories of measurement and reporting within a framework. It is designed so that pathways can be followed to outline the elements that make up a specific framework. The schematic, along with detailed descriptions of the categories and the elements held within each of the categories, are provided in the main report.

Appendix A: Systematic review focus areas

The focus areas were developed to guide and standardise the review of each of the environmental reporting frameworks.

- **Context of framework** was chosen to provide a brief set of information on the frameworks' past present iteration and potential future adjustments. The section helps provide an effective timestamp.
- **Scope depth** was selected as the bulk of reporting frameworks utilised the GHGP for reporting emissions. In the cases where the GHGP was not utilised, this is used to identify the quantifiable data which can be reported upon.
- **Reporting requirements** was chosen as a focus area to define who must report to the framework, how often they must report and what information must be reported beyond the base quantified data discussed under Scope depth.
- **Target depth** was selected as a focus area to assess the environmental targets innate within the framework. These can be targets which were defined by the authority responsible for the framework, or any requirements to generate targets as tasked by the framework.
- **Mechanism that facilitates decarbonisation** was a selected focus to discuss how the framework requirements attempt to induce a reduction of environmental damage by the reporting body.
- **Effectiveness in facilitating decarbonisation** was chosen as a focus in order to assess the final outcome of the reporting framework, when possible.

These focus areas were selected in discussion with DESNZ to ensure that within each of the reviewed frameworks there would be informational consistency across each of the frameworks. In cases where information is not available, this is expressed in the report. Additional focus areas such as "additional reporting requirements" were considered, however this has been included within reporting requirements and not considered as additional. This was due to the fluctuation between each of the reporting requirements and determination of what is additional and what is core was not easily separable. "History of the framework" was also considered; however, this was adjusted to context of framework to encompass current and potential future changes to the framework, thus providing a fuller contextualisation of the framework. This focus was also condensed as much as possible in order to only provide relevant or actionable information and to not broaden the scope of this report beyond its key focuses of measurement, reporting and target setting.

The information gathered within the focus areas of scope depth, reporting requirement, target depth and mechanism that facilitates decarbonisation were incorporated into the pathway diagrams and are considered core to the comparison and description of the functioning of each framework. Effectiveness and context of framework provide additional yet relevant contextual information to the report each.

Appendix B: Emissions scopes

Scope 3 categories as defined by Greenhouse Gas Protocol Corporate Standard.

Code	Description
3.1	Purchased goods and services
3.2	Capital goods
3.3	Fuel and energy-related activities
3.4	Upstream transportation and distribution
3.5	Waste generated in operations
3.6	Business travel
3.7	Employee commuting
3.8	Upstream leased assets
3.9	Downstream transportation and distribution
3.10	Processing of sold products
3.11	Use of sold products
3.12	End-of-life treatment of sold products
3.13	Downstream leased assets
3.14	Franchises
3.15	Investments

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