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The Journey to Carbon Verification: Part 2

Getting Started on your GHG Reporting

Stephen Burt,
August 2024

Webinar Series Overview: The Journey to Carbon Verification

- **Part 1, 19/07/2024, Carbon Quantification, Mitigation and Reporting:**
 - Introduction, overview and context
 - Drivers
 - Options for standards and methodologies to use

- **Part 2, 22/08/2024, Getting Started on your GHG Reporting:**
 - Selecting and using appropriate standards and methodologies
 - Defining your organisational and reporting boundaries
 - Quantifying and Calculating your Scope 1, 2 and 3 GHG Emissions
 - Sources of Carbon Conversion Factors
 - Preparing a GHG Inventory
 - Establishing and reviewing base years

- **Part 3, 13/09/2024, GHG Mitigation, Reporting, Removals and Offsets:**
 - Planning for reductions
 - Options for removals and offset – pros and cons
 - Preparing your GHG Report and other documentation requirements
 - Verification options and case studies



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AMERICA'S NO.1

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Certification body in
telecommunications and
Automotive sector

TOP 3 IN THE UK

ISO 14064-1, PAS 2060 / ISO 14068-1,
PAS 2080, ISO 20121, ISO 26000, ISO
9001, ISO 14001, ISO 45001, ISO 27001,
ISO 50001 etc

GLOBAL NO.3

Certification body in
Aerospace sector

CHINA'S NO.1

Certification body in
Automotive sector

UK'S NO.2

Certification body in
Aerospace sector

NQA UK – CARBON & SUSTAINABILITY TEAM

Amber Dixon
Sustainability Assurance Manager



Stephen Burt
Carbon & Sustainability Services Director



PART 2: LEARNING OBJECTIVES

1. Understand your options for which standards and methodologies are most appropriate for your needs
2. Gain an *overview* of how to define your organisational and reporting boundaries
3. Gain an *overview* of how to calculate your Scope 1, 2 and 3 GHG Emissions, including where to find and which Conversion Factors to use
4. Gain an *overview* of how to prepare a GHG Inventory
5. Understand how to establish a base year, and when it's appropriate to change that

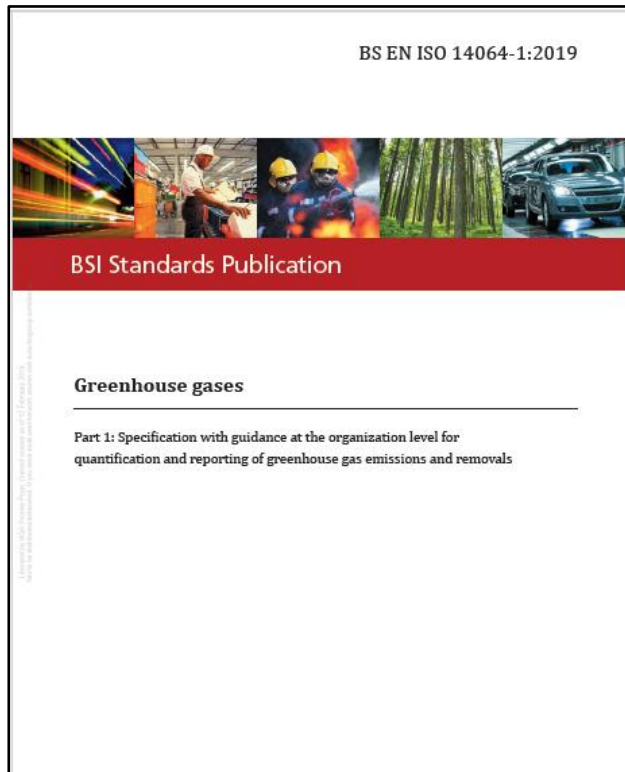


Note that we'll focus on GHG *emissions* only. We won't cover GHG *removals*.

SELECTING AND USING APPROPRIATE STANDARDS AND METHODOLOGIES

There are various sources of *standards & specifications* for quantifying, mitigating and reporting GHG emissions, depending on your needs:

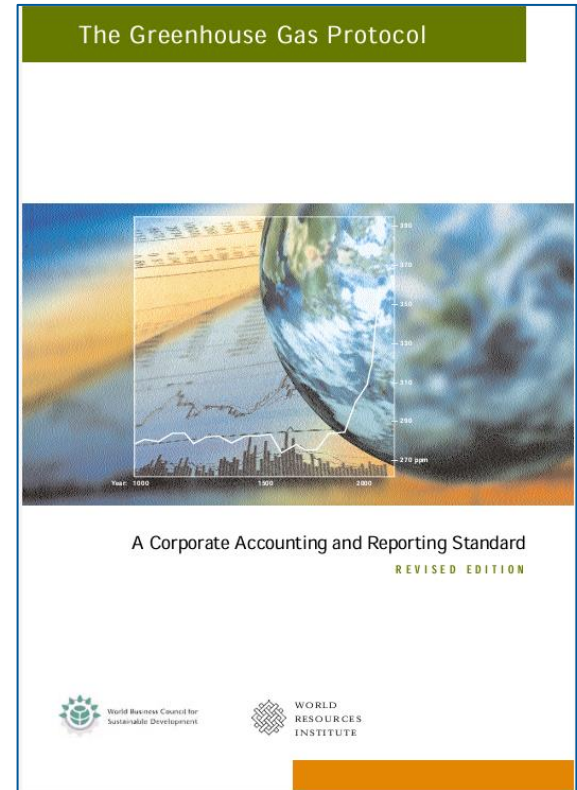
- ISO 14064-1:specification with guidance at the organisation level for quantification and reporting of greenhouse gas emissions and removals
 - Internationally recognised, highest tier of standards (ISO)
 - Provides a framework for quantifying (not calculating) and reporting GHG emissions and removals
 - Intended to be used at **organisational** level
 - Includes optional GHG mitigation framework
 - Allows for external, third party, Verification via Verification Bodies such as NQA, providing for credibility and assurance



SELECTING AND USING APPROPRIATE STANDARDS AND METHODOLOGIES

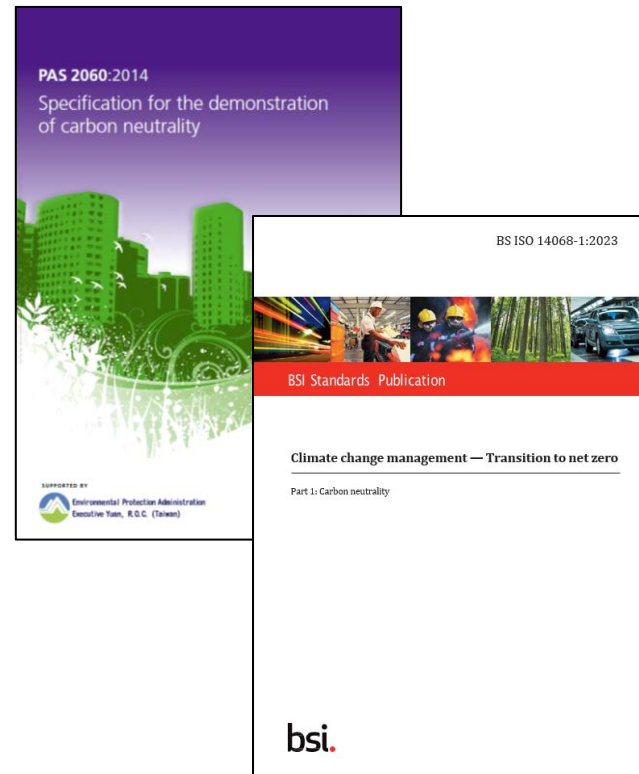
There are various sources of methodologies for calculating and quantifying GHG emissions, depending on your needs:

- GHG Protocol: Corporate Accounting and Reporting Standard
 - Provides comprehensive guidance on categorising and calculating Scope 1, 2 and 3 activities
 - Does not provide conversion factors
 - Does **not** provide for external, third party, Verification
 - <https://ghgprotocol.org/>



There are various sources of *standards / specifications* for quantifying, mitigating and reporting GHG emissions, depending on your needs:

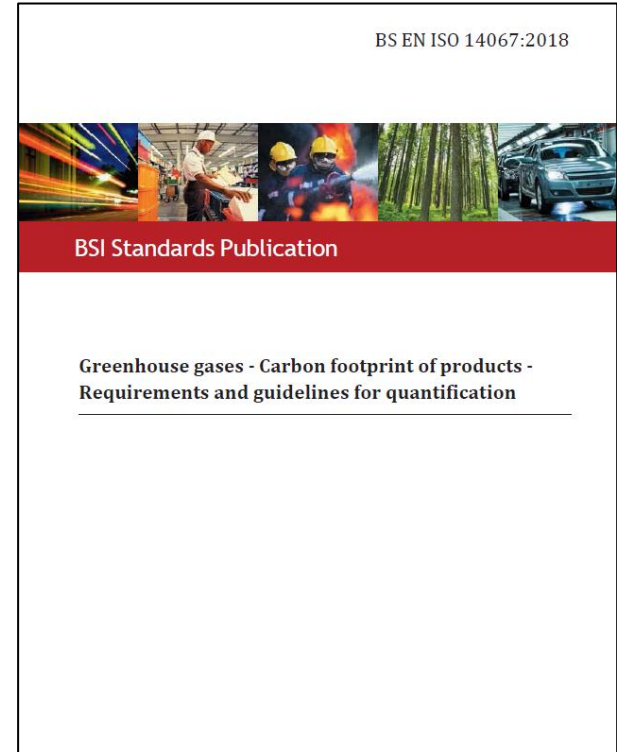
- ISO 14068-1 / PAS 2060: specifications for demonstrating carbon neutrality
 - Internationally recognised, highest tier of standards (ISO)
 - Provides a framework for quantifying (not calculating), reducing, removing, offsetting and reporting GHG emissions
 - Intended to be used for **organisations, products & services, buildings and events**
 - ISO 14064-1 is a recognised basis as a step towards this
 - Allows for external, third party, Verification via Verification Bodies such as NQA, providing for credibility and assurance



SELECTING AND USING APPROPRIATE STANDARDS AND METHODOLOGIES

There are various sources of *standards / specifications* for quantifying, mitigating and reporting GHG emissions, depending on your needs:

- ISO 14067: Carbon footprint of products – Requirements and guidelines for quantification
 - Internationally recognised, highest tier of standards (ISO)
 - Provides a framework for quantifying (not calculating) and reporting product carbon footprints
 - Intended to be used at **product** level
 - Allows for external, third party, Verification via Verification Bodies such as NQA, providing for credibility and assurance



There are various sources of *standards / specifications* for quantifying, mitigating and reporting GHG emissions, depending on your needs:

- PAS 2050: Specification for the assessment of the life cycle GHG emissions of goods and services
 - Internationally recognised, highest tier of standards (ISO)
 - Provides a framework for assessing life cycle GHG emissions
 - Intended to be used at **goods and services** level
 - Allows for external, third party, Verification via Verification Bodies such as NQA, providing for credibility and assurance

PUBLICLY AVAILABLE SPECIFICATION

PAS 2050:2011

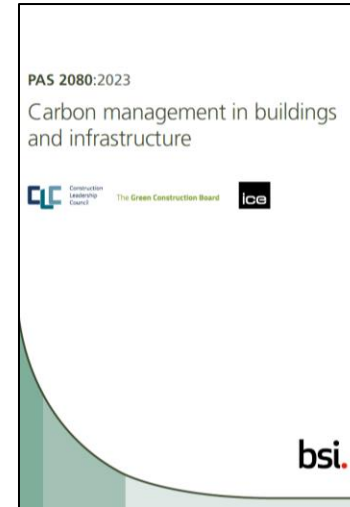
Specification for the assessment of the life cycle greenhouse gas emissions of goods and services



SELECTING AND USING APPROPRIATE STANDARDS AND METHODOLOGIES

There are various sources of *standards / specifications* for quantifying, mitigating and reporting GHG emissions, depending on your needs:

- PAS 2080: carbon management in buildings and infrastructure
 - Developed in the UK, but internationally recognised
 - Provides a framework for managing (not calculating), carbon in **buildings and infrastructure assets**
 - Intended for application in the construction industry
 - Allows for external, third party, Verification via Verification Bodies such as NQA, providing for credibility and assurance
- RICS Whole life carbon assessment for the built environment:
 - Provides a framework for assessing whole life carbon in **buildings and infrastructure** works



DEFINING YOUR ORGANISATIONAL AND REPORTING BOUNDARIES

DEFINING YOUR ORGANISATIONAL AND REPORTING BOUNDARIES

This is the first step and is highly critical. It provides absolute clarity on what is covered by / included in your GHG calculations, and what is not.

Organisational Boundaries relate to which company, sites, facilities are included in your GHG calculations.

Reporting Boundaries relate to which Direct (scope 1) and Indirect (scopes 2 and 3) GHG emissions are included / excluded in your GHG calculations, with explanation and justification.



DEFINING YOUR ORGANISATIONAL AND REPORTING BOUNDARIES

Within your boundaries, you should include:

- All Direct (scope 1) GHG emissions
- All Indirect Imported Energy (scope 2) GHG emissions
- All *significant* Indirect (scope 3) GHG emissions
 - Any exclusions should be justified and documented
 - Criteria for significance evaluation might include the scale of the emissions, the levels of influence, the availability of information and the accuracy of associated data

ISO 14064-1 provides some relevant *principles*:

- Completeness (clause 4.3)
 - Include **all relevant** GHG emissions and removals
- Consistency (clause 4.4)
 - Enable **meaningful comparisons** in GHG-related information
- Transparency (clause 4.6)
 - **Disclose sufficient and appropriate GHG-related information** to allow intended users to make decisions with reasonable **confidence**



QUANTIFYING AND CALCULATING YOUR SCOPE 1, 2 AND 3 GHG EMISSIONS

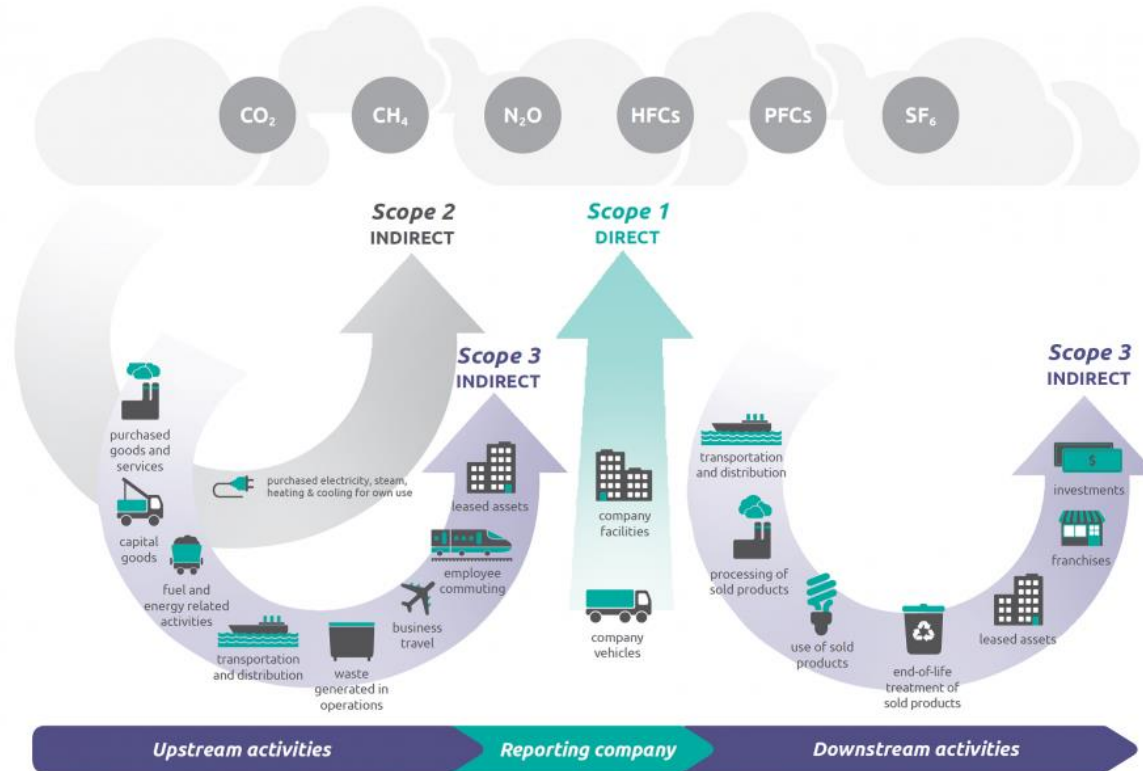
QUANTIFYING AND CALCULATING YOUR SCOPE 1, 2 AND 3 GHG EMISSIONS

Now that you have established your organisational and reporting boundaries, the next step is to identify and to categorise your GHG emission sources.

The 'Scope 1, 2 and 3' emission categories are very commonly used, for example in the GHG Protocol. They are not used in ISO 14064-1 however.....

GHG Protocol Categories	ISO 14064-1 Categories	Examples
Scope 1	Direct GHG Emissions	Natural gas, petrol and diesel, LPG, heating oil, FGas losses
Scope 2	Indirect GHG emissions (from imported energy)	Electricity, purchased heat and steam
Scope 3 (15 sub-categories)	Indirect GHG emissions (4 categories)	See next slides

QUANTIFYING AND CALCULATING YOUR SCOPE 1, 2 AND 3 GHG EMISSIONS



QUANTIFYING AND CALCULATING YOUR SCOPE 1, 2 AND 3 GHG EMISSIONS

GHG Protocol Scope 3 Categories (15 of)	ISO 14064-1 Indirect Emission Categories (4 of)	Examples
Category 1 - Purchased good and services	Indirect from products used by organisation	Raw materials, consumables, maintenance
Category 2 - Capital goods	Indirect from products used by organisation	Machinery, plant
Category 3 - Fuel and energy related emissions not included in scope 1 and 2	Indirect from other sources	T&D losses, Well to Tank
Category 4 - Upstream transportation and distribution	Indirect from transportation	Delivery vehicles, sea and air transport of materials
Category 5 - Waste generated in operations	Indirect from other sources	Waste, wastewater / trade effluent
Category 6 - Business travel	Indirect from transportation	Flights, trains, hotels, cars
Category 7 - Employee commuting	Indirect from transportation	Cars, trains, buses, homeworking
Category 8 - Upstream leased assets	Indirect from other sources	Material receipt and storage warehouses
Category 9 - Downstream transportation and distribution	Indirect from transportation	Delivery vehicles, sea and air transport of materials
Category 10 - Processing of sold products	Indirect from the use of products from the organisation	Downstream value chain partners
Category 11 - Use of sold products	Indirect from the use of products from the organisation	Energy consumption during use
Category 12 - End-of-life treatment of sold products	Indirect from the use of products from the organisation	Final disposal
Category 13 - Downstream leased assets	Indirect from other sources	Product storage warehouses
Category 14 - Franchises	Indirect from other sources	Franchise operations
Category 15 - Investments	Indirect from other sources	Investors and financial services only

QUANTIFYING AND CALCULATING YOUR SCOPE 1, 2 AND 3 GHG EMISSIONS

How it feels while Calculating
different Carbon Emissions

Scope 1 & 2



Scope 3






QUANTIFYING AND CALCULATING YOUR SCOPE 1, 2 AND 3 GHG EMISSIONS

There is a wealth of excellent Guidance available for all these categories: <https://ghgprotocol.org/scope-3-calculation-guidance-2>

ISO 14064-1 again provides some relevant *principles*:

- Relevance (clause 4.2)
 - Include **all relevant** GHG emissions Select the GHG sources, GHG sinks, GHG reservoirs, data and methodologies appropriate to the needs of the intended user removals
- Consistency (clause 4.4)
 - Enable **meaningful comparisons** in GHG-related information
- Accuracy (clause 4.5)
 - **Reduce bias and uncertainties** as far as is practical

STANDARDS & GUIDANCE	TOOLS & RESOURCES	E-LEARNING	BUILT ON GHG PROTOCOL	EVENTS & NEWS
 <p>Guidance by Scope 3 Category Introduction Date: April 2013 Size: 1.75 MB</p> <p>Category 1 - Purchased goods and services Date: April 2013 Size: 607.85 KB</p> <p>Category 2 - Capital goods Date: April 2013 Size: 181.49 KB</p> <p>Category 3 - Fuel- and energy-related activities Date: April 2013 Size: 443.25 KB</p> <p>Category 4 - Upstream transportation and distribution Date: October 2013 Size: 587.97 KB</p> <p>Category 5 - Waste generated in operations Date: April 2013 Size: 477.3 KB</p>	 <p>Guidance by Scope 3 Category Category 6 - Business travel Date: April 2013 Size: 233.99 KB</p> <p>Category 7 - Employee commuting Date: April 2013 Size: 223.42 KB</p> <p>Category 8 - Upstream leased assets Date: April 2013 Size: 234.39 KB</p> <p>Category 9 - Downstream transportation and distribution Date: April 2013 Size: 334.68 KB</p> <p>Category 10 - Processing of sold products Date: April 2013 Size: 230.57 KB</p> <p>Category 11 - Use of sold products Date: April 2013 Size: 288.39 KB</p> <p>Category 12 - End-of-life treatment of sold products Date: April 2013 Size: 202.77 KB</p>	 <p>Guidance by Scope 3 Category Category 13 - Downstream leased assets Date: April 2013 Size: 174.61 KB</p> <p>Category 14 - Franchises Date: April 2013 Size: 229.98 KB</p> <p>Category 15 - Investments Date: April 2013 Size: 327.61 KB</p> <p>Appendix A - Sampling Date: April 2013 Size: 202.11 KB</p> <p>Appendix B - Scenario Uncertainty Date: April 2013 Size: 182.93 KB</p> <p>Appendix C - Intensity Metrics Date: April 2013 Size: 173.42 KB</p> <p>Appendix D - Summary Tables Date: April 2013 Size: 235.17 KB</p>		



QUANTIFYING AND CALCULATING YOUR SCOPE 1, 2 AND 3 GHG EMISSIONS

Quantifying Scope 1 and 2 Emissions for a specific data period, eg 2023:

GHG Protocol Categories	Typical Record Sources	Typical data to gather for conversion to tCO ₂ e
Scope 1	<p>Natural gas invoices / meter readings / supplier portal.</p> <p>Petrol and diesel invoices / delivery records / expenses claims.</p> <p>LPG and heating oil invoices / meter readings / delivery records.</p> <p>FGas maintenance records.</p>	<p>kWh used.</p> <p>Litres used / miles driven.</p> <p>Litres / kg / kWh used.</p> <p>kg and types of FGas lost from systems.</p>
Scope 2	<p>Electricity invoices / meter readings / supplier portal.</p> <p>Purchased heat and steam invoices / meter readings.</p> <p>Purchased cooling invoices / meter readings.</p>	<p>kWh used.</p> <p>Litres / cubic metres / therms / kWh used.</p> <p>Litres / cubic metres used.</p>

QUANTIFYING AND CALCULATING YOUR SCOPE 1, 2 AND 3 GHG EMISSIONS

Quantifying *Common* Scope 3 Emissions for a specific data period, eg 2023:

GHG Protocol Scope 3 Categories	Typical Record Sources	Typical data to gather for conversion to tCO2e
Cat 1, Purchased Goods and Services Cat 2, Capital Goods	Purchase Orders / Delivery Notes / Invoices AND / OR Financial systems: £ spend	Quantity / Weight / Type of Materials. £ spend.
Cat 3 - Fuel and energy related emissions not included in scope 1 and 2	Natural gas invoices / meter readings / supplier portal. Petrol and diesel invoices / delivery records / expenses claims. LPG and heating oil invoices / meter readings / delivery records	kWh used. Litres used / miles driven. Litres / kg / kWh used.
Cat 4 & Cat 9 - Upstream / Downstream transportation and distribution	Delivery Notes / Invoices / Supplier Reports. Postcode analysis databases. Air miles calculators. Sea miles calculators.	Air / sea / road miles. Weights of goods shipped.

QUANTIFYING AND CALCULATING YOUR SCOPE 1, 2 AND 3 GHG EMISSIONS

Quantifying *Common* Scope 3 Emissions for a specific data period, eg 2023:

GHG Protocol Scope 3 Categories	Typical Record Sources	Typical data to gather for conversion to tCO ₂ e
Cat 5 - Waste generated in operations	Waste Transfer Notes. Waste management contractor reports. Internal weighing scales (calibrated).	Tonnes of waste by material. Tonnes of waste by destination.
Cat 6 - Business travel	Company car / van / truck fuel cards data reports. Expenses claims. Travel agency reports.	Litres used / miles driven. Road / ferry / air / taxi / rail / bus miles.
Cat 7 - Employee commuting, often including homeworking	Staff surveys.	Road / rail / bus miles.
Cat 11 - Use of sold products	Product design specifications / Life Cycle Assessments. Assumptions on typical customer usage patterns. Assumptions on typical product lifespan.	kWh used. Hours operational. Years operational.
Cat 12 - End-of-life treatment of sold products	Customer assumptions on typical lifespan. Customer assumptions on likely disposal routes.	Tonnes of waste by material. Tonnes of waste by destination.

SOURCES OF CARBON CONVERSION FACTORS



SOURCES OF CARBON CONVERSION FACTORS


There is a single source for calculating and quantifying GHG emissions which should meet all your needs:

- UK Government (DESNZ) Carbon Conversion Factors and UK Environmental Reporting Guidelines
 - Provides comprehensive carbon conversion factors for each year, updated annually, and covering Scope 1, 2 and 3 activities
 - <https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2023>


Introduction

[Index](#)

Next publication date:	10/06/2024	Factor set:	Full set
Version:	1.1	Year:	2023



Department for
Energy Security
& Net Zero



Department
for Environment
Food & Rural Affairs

UK Government GHG Conversion Factors for Company Reporting

Welcome to the UK Government Conversion Factors for greenhouse gas (GHG) reporting. These factors are suitable for use by UK-based organisations of all sizes and international organisations reporting on UK operations. Therefore, the scope of the factors is defined such that it is relevant to emissions reporting. The factors may also be used for other purposes, but users do this at their own risk.

For new users of the conversion factors, ensure that you have first read the government's 'Environmental reporting guidelines' and the information on the rest of this sheet. Then follow the informative text at the top of each tab to report your emissions across Scopes 1, 2 and 3. It is not necessary to read the 'What's new' guidance.

If you have used the conversion factors before, ensure you have read the 'What's new' guidance to understand the changes that have been made to the factors over the last year. Following the 'What's new' guidance will ensure that reporting is consistent and comparable year on year. Please note - activity-specific 'What's new' information is repeated in the relevant activity tabs.

For information about how the conversion factors have been derived, please refer to the accompanying 'Methodology paper' to the conversion factors.

Please note - factors that are:

- (a) not available, will be marked with an empty, light shaded cell:
- (b) have an invalid combination of criteria, will be marked with an empty, dark shaded cell:

How is this spreadsheet organised?

After the three introductory worksheets, each worksheet presents the emission factors for a single type of emissions-releasing activity (for example, using electricity or driving a passenger vehicle). These emissions-releasing activities are categorised into three groups known as scopes. Each activity is colour coded as either Scope 1, Scope 2, or Scope 3. Refer to the 'Index' tab for links to each sheet.

- **Scope 1 (direct emissions)** emissions are those from activities owned or controlled by your organisation. Examples of Scope 1 emissions include emissions from combustion in owned or controlled boilers, furnaces and vehicles; and emissions from chemical production in owned or controlled process equipment.
- **Scope 2 (energy indirect)** emissions are those released into the atmosphere that are associated with your consumption of purchased electricity, heat, steam and cooling. These indirect emissions are a consequence of your organisation's energy use, but occur at sources you do not own or control.
- **Scope 3 (other indirect)** emissions are a consequence of your actions that occur at sources you do not own or control and are not classed as Scope 2 emissions. Examples of Scope 3 emissions are business travel by means not owned or controlled by your organisation, waste disposal, materials or fuels your organisation purchases. Deciding if emissions from a vehicle, office or factory that you use are Scope 1 or Scope 3 may depend on how you define your operational boundaries. Scope 3 emissions can be from activities that are upstream or downstream of your organisation.

More information on Scope 3 and other aspects of reporting can be found in the Greenhouse Gas Protocol Corporate Standard.



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SOURCES OF CARBON CONVERSION FACTORS

UK Government (DESNZ) Carbon Conversion Factors and UK Environmental Reporting Guidelines

Scope	Conversion Factors Available	Examples for Conversion to tCO ₂ e
Scope 1	Gaseous, liquid, solid and bio fuels FGases Passenger and Delivery Vehicles	Natural gas, LPG, diesel, petrol (litres, kWh etc). HFCs, PFCs, HCFCs (kgs). Cars, vans, HGVs (litres, miles, km)
Scope 2	Electricity Heat and steam	Grid, Overseas, EVs (kWh). Onsite and district systems (kWh).
Scope 3, Cat 1 & 2	Water supply Material use	Mains water (litres) Metals, plastics, electricals, construction (tonnes)
Scope 3, Cat 3	Transmission and Distribution losses Well-to-Tank	Grid electricity, district heat and steam (kWh). Gaseous & liquid fuels; electricity; heat and steam; road, sea and air travel (litres, kWh, miles etc).
Scope 3, Cats 4 and 9	Freighting goods	Vans, HGVs, air, sea, rail (miles, km, tonnes).



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SOURCES OF CARBON CONVERSION FACTORS

UK Government (DESNZ) Carbon Conversion Factors and UK Environmental Reporting Guidelines

Scope	Conversion Factors Available	Examples for Conversion to tCO ₂ e
Scope 3, Cat 5	Waste water treatment Waste	Waste water and trade effluent (litres). Metals, plastics, electricals, construction by destination (tonnes).
Scope 3, Cat 6	Business travel	Air, land, sea, hotels (miles, km, nights).
Scope 3, Cat 7	Commuting (and homeworking)	Road, rail, bus, taxi, motorbike (miles). Homeworking (hours).
Scope 3, Cat 11	Electricity Gaseous, liquid, solid and bio fuels	Grid (kWh). Natural gas, LPG, diesel, petrol (litres, kWh etc).
Scope 3, Cat 12	End-of-Life Waste	Metals, plastics, electricals by final destination (tonnes).

SOURCES OF CARBON CONVERSION FACTORS

When faced with daunting volumes of, or a lack of, information, particularly for Purchased Goods, there are various *spend based* sources of methodologies for calculating and quantifying GHG emissions:

- For example:
 - DEFRA Conversion factors by SIC code: GHG emission intensity by SIC - CO₂e/£ - enabling a spend based approach
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1085190/Table_13.ods
 - Office for National Statistics: GHG emission intensity by economic sector CO₂e/£ - enabling a spend based approach
<https://www.ons.gov.uk/economy/environmentalaccounts/datasets/ukenvironmentalaccountsatmosphericemissionsgreenhousegasemissionsintensitybyeconomicsectorunitedkingdom>

The screenshot shows the ONS website interface. At the top, there are navigation links for Home, Business, industry and trade, Economy, Employment and labour market, People, population and community, and Taking part in a survey. A search bar is present with the text 'Search for a keyword(s) or time series ID'. Below the search bar, the breadcrumb trail reads 'Home > Economy > Environmental accounts'. The main heading is 'Dataset Atmospheric emissions: greenhouse gas emissions intensity by industry'. There are links for 'Contact: Environmental Accounts team', 'Release date: 05 June 2024', and 'Next release: To be announced'. A green button says 'View all data related to environmental accounts'. Below this, a short description reads: 'Greenhouse gas and carbon dioxide emissions intensity (the level of emissions per unit of economic output), by industry (SIC 2007 group - around 130 categories), UK, 1990 to 2022.'

	GHG (kgCO ₂ e per £)	CO ₂ (kgCO ₂ per £)	
01	Products of agriculture, hunting and related services	1.974	0.459
02	Products of forestry, logging and related services	0.279	0.139
03	Fish and other fishing products; aquaculture products; support services to fishing	0.523	0.390
05	Coal and lignite	1.117	0.349
06	Crude petroleum and natural gas	0.660	0.511
08	Other mining and quarrying products	0.534	0.407
09	Mining support services	0.345	0.236
10.1	Preserved meat and meat products	0.772	0.316
10.2-3	Processed and preserved fish, crustaceans, molluscs, fruit and vegetables	0.721	0.390
10.4	Vegetable and animal oils and fats	0.976	0.437
10.5	Dairy products	0.962	0.394
10.6	Grain mill products, starches and starch products	0.755	0.441
10.7	Bakery and farinaceous products	0.451	0.251
10.8	Other food products	0.661	0.295
10.9	Prepared animal feeds	0.912	0.391
11.03-6	Alcoholic beverages	0.707	0.343
11.07	Soft drinks	0.332	0.188
12	Tobacco products	0.203	0.096
13	Textiles	0.771	0.556
14	Wearing apparel	0.791	0.582
15	Leather and related products	0.736	0.481
16	Wood and of products of wood and cork, except furniture; articles of straw and plaiting materials	0.475	0.394
17	Paper and paper products	0.707	0.531
18	Printing and recording services	0.382	0.287
19	Coke and refined petroleum products	1.930	1.140
20.3	Paints, varnishes and similar coatings, printing ink and mastics	1.331	0.873
20.4	Soap and detergents, cleaning and polishing preparations, perfumes and toilet preparations	0.719	0.488
	Other chemical products	1.381	0.903

SOURCES OF CARBON CONVERSION FACTORS

Depending on your organisation's activities, you may also need conversion factors for operations in other countries, particularly for Scope 2 (electricity):

- The UK Government (DESNZ) Carbon Conversion Factors provides links (overseas electricity tab) to Conversion Factors for electricity generation, as well as for some transmission & distribution losses for:
 - EU countries (but at a generic level)
 - USA
 - Ireland
 - France
- Reliable Scope 2 Conversion Factor data is available for many other countries, particularly in the EU, from the national Environmental Agencies
- Scope 3 conversion factors for other countries are rare.



PREPARING A GHG INVENTORY



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PREPARING A GHG INVENTORY

ISO 14064-1 defines a GHG Inventory as:

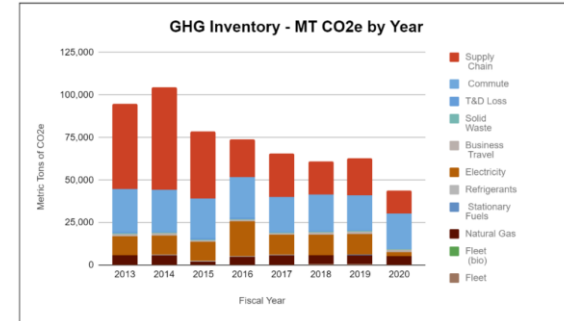
- A list of GHG sources and GHG sinks, and their quantified GHG emissions

Often this is presented in an Excel Workbook format. There are many off-the-shelf software packages which also provide for the same.

Typical contents:

- A tab / page presenting the quantified activity totals (usually one tab / page for Scope 1, one for Scope 2 and one for each of the applicable sub-categories of Scope 3), the CFs used, and the calculation of total tCO₂e
- Graphs displaying totals by Scope, by category and an overall summary.

It is a very good idea, for Verification purposes, to establish folders for each GHG source to accompany the GHG Inventory, containing the necessary records to evidence the GHG emission source quantification.





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PREPARING A GHG INVENTORY

A typical example:

29.4.2) (G:) > Carbon Footprint - NQA Internal Sustainability > NQA Carbon Calcs and Reporting > 2023 >

Name	Date modified	Type	Size
2023 Carbon Calcs	12/07/2024 17:49	File folder	
Raw Data	22/08/2024 08:40	File folder	

Internal Sustainability > NQA Carbon Calcs and Reporting > 2023 > 2023 Carbon Calcs > 2023 Carbon Calcs >

Name	Date modified	Type	Size
GHG Inventory	14/08/2024 11:25	File folder	
Scope 1 Fleet	12/07/2024 17:49	File folder	
Scope 1 Grey Fleet	12/07/2024 17:49	File folder	
Scope 1 Natural Gas	12/07/2024 17:49	File folder	
Scope 2 Electricity	12/07/2024 17:49	File folder	
Scope 3 Cat 1 Purchased Goods and Serv...	12/07/2024 17:51	File folder	
Scope 3 Cat 2 Capital Goods	12/07/2024 17:51	File folder	
Scope 3 Cat 3 FERA	12/07/2024 17:51	File folder	
Scope 3 Cat 4 and Cat 9 Upstream and D...	12/07/2024 17:51	File folder	
Scope 3 Cat 5 Waste	12/07/2024 17:51	File folder	
Scope 3 Cat 6 Business Travel	12/07/2024 17:52	File folder	
Scope 3 Cat 7 Commuting	12/07/2024 17:52	File folder	
GHG Protocol Category Applicability 2023	20/04/2023 15:10	Microsoft Word D...	13 KB
ghg-conversion-factors-2023-full-file-up...	05/06/2024 07:36	Microsoft Excel W...	2,036 KB



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PREPARING A GHG INVENTORY

A typical example:

B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
	Gas (kWh)	Gas CF	kgCO2e											
2019	137898	0.18385	25353											
2020	111795	0.18387	20556											
2021	82581.5	0.18316	15126											
2022	77802	0.18254	14202											
2023	174069	0.18293	31842											

S1 Fleet & Grey Fleet

S1 FGas

S1 Gas

S2 Electricity

S3.1.1 PG&S Homeworking

S3.1.2 PG&S Associates

S3.1.3 PG&S Hotels

S3.1.4 PG&S Procured Materials



NEVER STOP IMPROVING

PREPARING A GHG INVENTORY

A typical example:

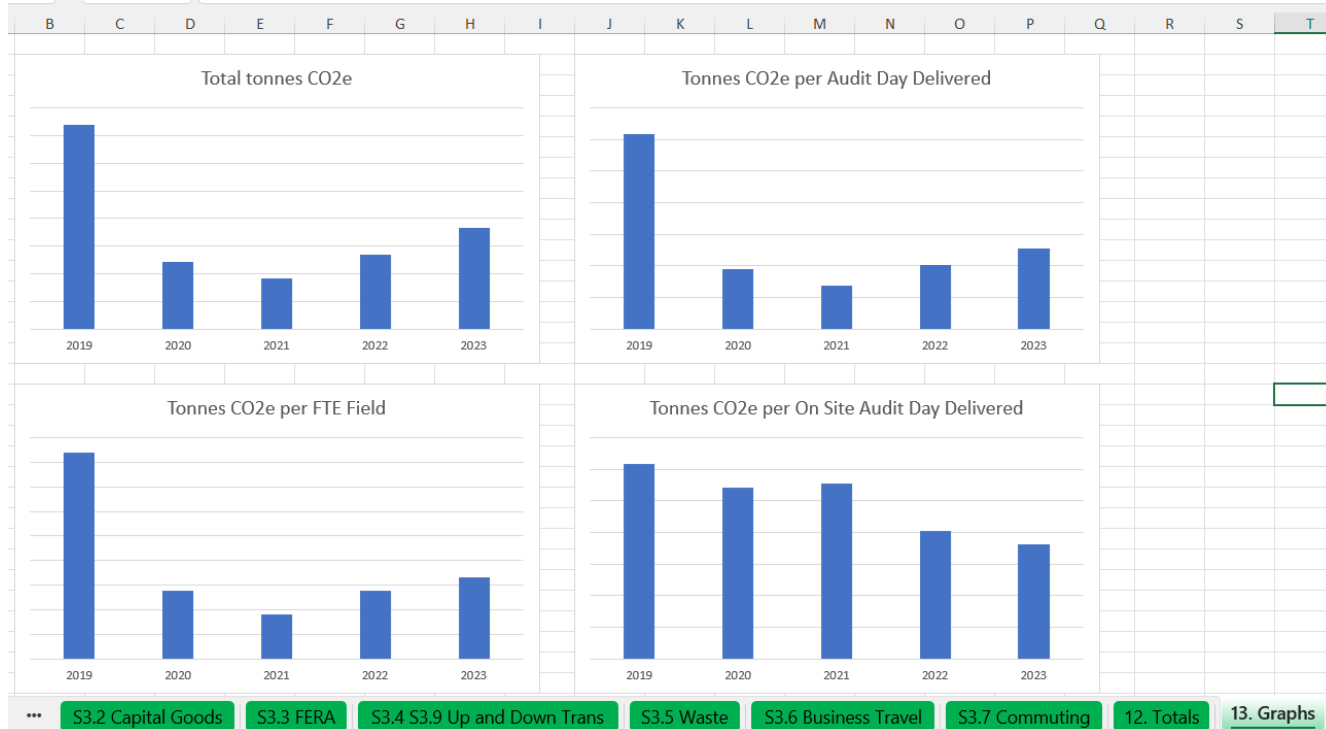
C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
	Electricity (kWh)	Electricity T&D CF	Electricity WTT CF	Gas (kWh)	Gas WTT CF	Diesel (kWh)	Diesel WTT CF	Petrol (kWh)	Petrol WTT CF	PHEV (miles)	PHEV T&D CF	EV (miles)	EV T&D CF	kg CO2e FERA		
2019	156935	0.0217	0.03565	137898	0.02391	438166	0.05822	167565	0.06318	0	0.00561	0	0.00758	48394		
2020	121129	0.02005	0.03217	111795	0.02391	129545	0.05765	48172	0.06274	0	0.00346	411	0.00729	19492		
2021	88858	0.01879	0.05529	82582	0.03135	53450	0.0575	31823	0.06425	0	0.00339	84977	0.00717	14899		
2022	92805	0.01769	0.04625	77802	0.0311	103786	0.0575	270340	0.06425	66615	0.00338	105140	0.00694	32645		
2023	99741	0.01792	0.0459	174069	0.03021	190170	0.05816	296905	0.0614	6034	0.003589	117183	0.007028	41759		
	Diesel miles	Diesel gallon	Diesel litres	Diesel kWh		Petrol miles	PHEV miles	Hybrid Miles	Petrol gallon	Petrol litre	Petrol kWh					
2019	584221	9737.0167	43816.575	438165.75		2019	186183	0	0	4137	18618	167565				
2020	172727	2878.7833	12954.525	129545.25		2020	53524	0	0	1189	5352	48172				
2021	71267	1187.7833	5345.025	53450.25		2021	35359	0	0	786	3536	31823				
2022	138381	2306.35	10378.575	103785.75		2022	100533	66615	133230	6675	30038	270340				
2023	253559.5	4225.9917	19016.963	190169.63		2023	190211	6034	133649	7331	32989	296905				



NEVER STOP IMPROVING

PREPARING A GHG INVENTORY

A typical example:

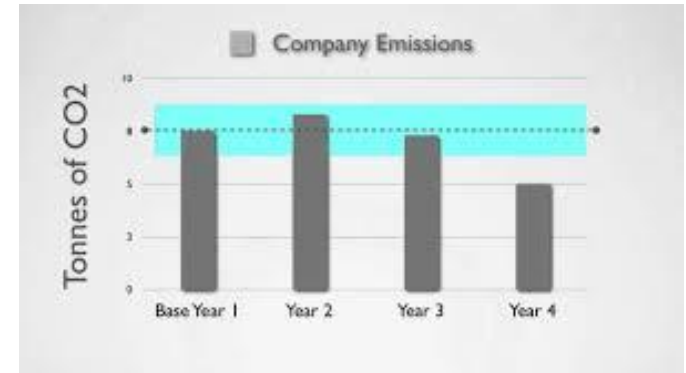


ESTABLISHING AND REVIEWING BASE YEARS

ESTABLISHING AND REVIEWING BASELINES

Your first year's calculation and quantification will usually provide you with a base-year:

- Allows for year-on-year comparison, to demonstrate improvement (or otherwise)
- The base-year may require to be reviewed and / or re-set, as a result of:
 - An organisational boundary or reporting boundary change
 - A change in the quantification process
 - A change in the conversion factors available
 - The discovery of a previous error
- Any change must be justified
- Any change should be applied to previous years' data too, to allow meaningful like-for-like comparison.



NEXT TIME

- **Part 3, 13/09/2024, GHG Mitigation, Reporting, Offsetting and Removals:**
 - Planning for reductions
 - Options for offsetting and removals
 - Preparing your GHG Report and other documentation requirements
 - Verification options and case studies



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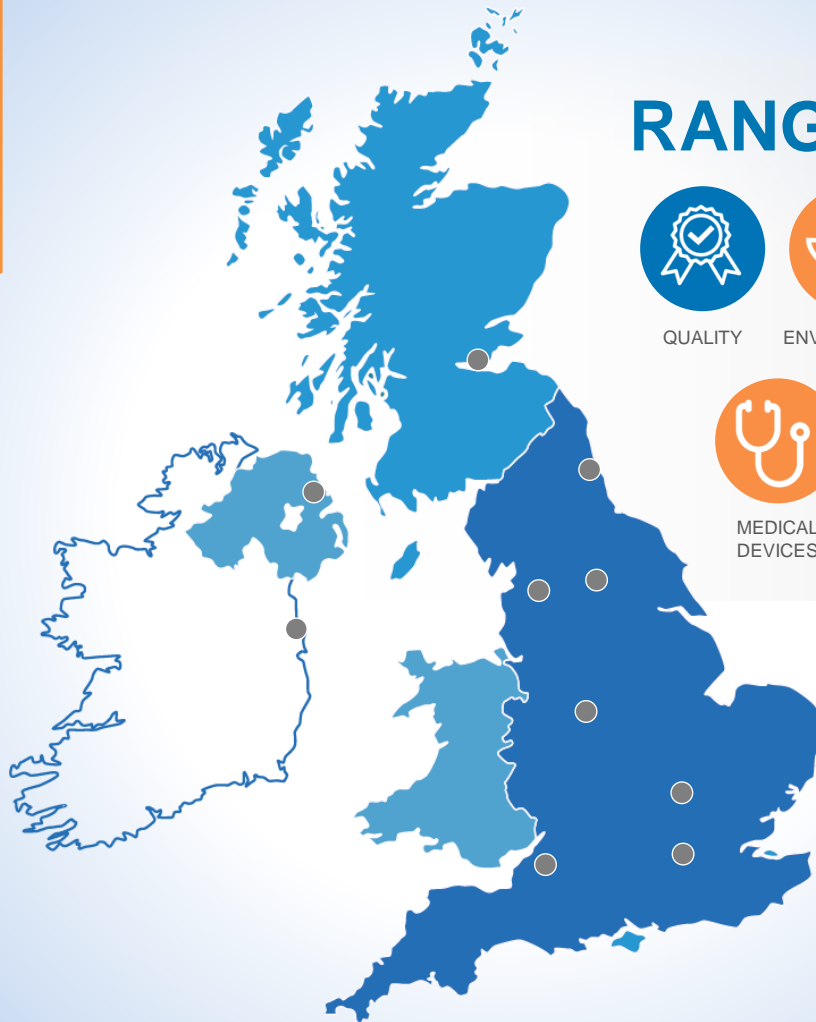
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THANK YOU!

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Q&A

