creating trust *driving progress*

The Journey to Carbon Verification

Stephen Burt & Busra Sahin, September 2025

Webinar Series Overview: The Journey to Carbon Verification

Part 1, 01/09/2025, Carbon Quantification, Mitigation and Reporting:

- Introduction, overview and context
- Drivers
- Options for standards and methodologies to use

Part 2, 18/09/2025, Getting Started on your GHG Reporting:

- Defining your organisational and reporting boundaries
- Selecting and using appropriate standards and methodologies
- Using Conversion Factors
- Establishing baselines
- Calculating your Scope 1, 2 and 3 GHG Emissions
- Preparing a GHG Inventory
- Determining Materiality

Part 3, 24/10/2025, 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

Introduction To Stephen Burt

Stephen Burt
Carbon & Sustainability Services Director

- Over 25 years' experience in carbon, energy and environmental management
- 15 years at NQA
- Chartered Environmentalist; BSc; MSc; PhD (net zero related, in progress)
- Lead GHG Verifier (ISO 14064-1, ISO 14068-1, PAS 2060, PAS 2080)
- Lead Auditor (ISO 20121, ISO 14001, ISO 50001, ISO 9001, ISO 45001)
- Member of SES/1/1 and SES/1/7, developing ISO standards for GHG and environmental schemes

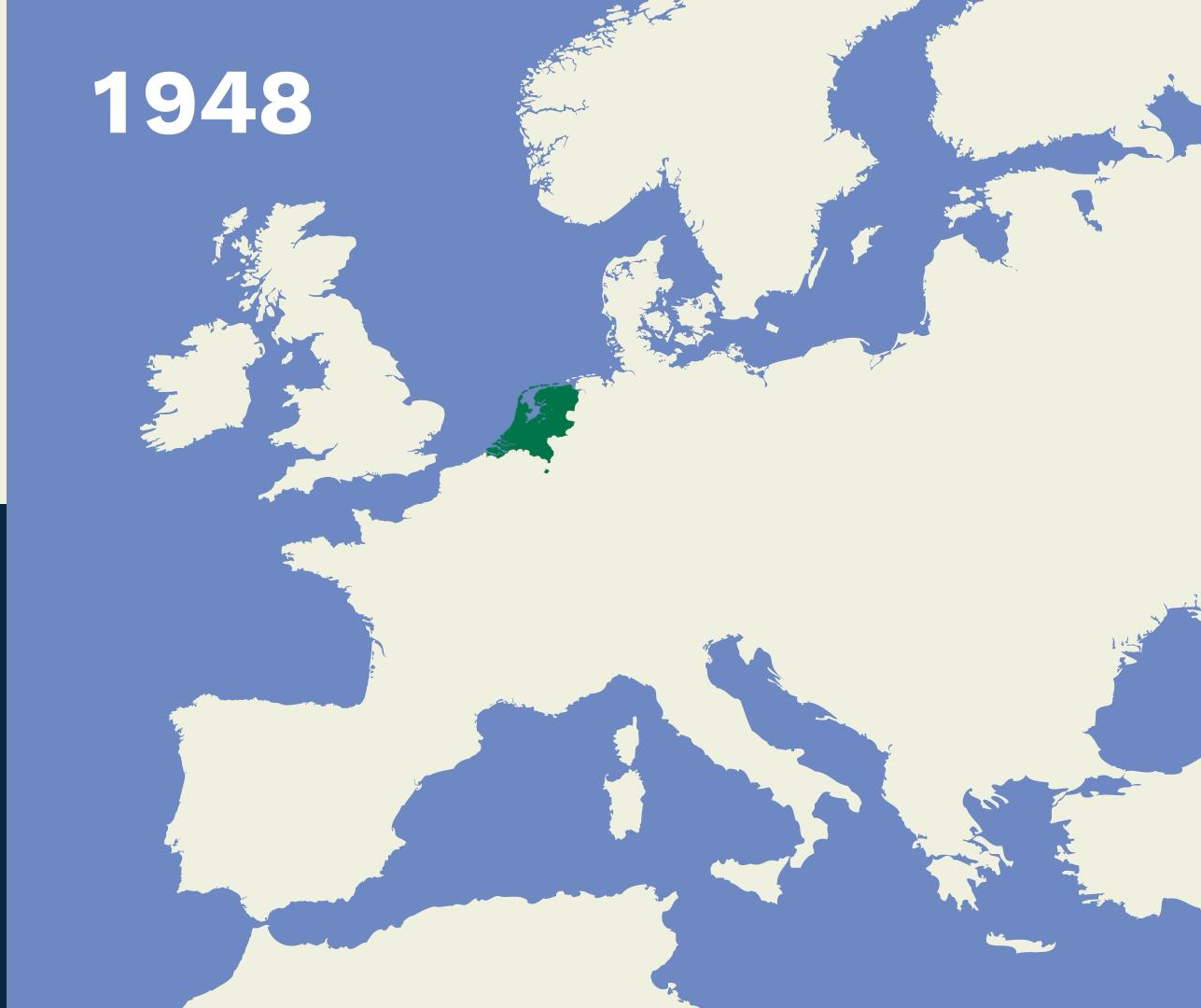
Introduction To Busra Sahin

Busra Sahin
Product Manager ESG Services & GHG Verification

- Over 8 years' experience in Sustainability, Supply chain due diligence and ESG
- 2 years at Kiwa Berlin
- BSc Food Engineering, MSc Applied Natural Science
- Lead Auditor (EU Conflict Mineral Regulation, EU Battery Regulation Due Diligence, Kiwa Sustainability Standard, Solar Stewardship Initiative ESG Standard)

Kiwa’s global operations and employees

~12.000 employees in 35 countries



Sustainability services with Kiwa

Life Cycle Assessment

Corporate Carbon Footprint

ESG Certification

Supply Chain Due Diligence (SCDD)

ESG Reporting

Sustainability services with Kiwa

Our ISO Certification and Verification Services:

ENVIRONMENTAL
13. Climate Action

- ISO 14064-1 Verification - GHG Quantification and Reporting
- ISO14068-1 / PAS 2060 Verification - Carbon Neutrality
- PAS 2080 Certification - Carbon Management in Buildings and Infrastructure
- ISO 20121 – Sustainable Events
- ISO 14001 - Environmental
- ISO 50001 – Energy
- Environmental Product Declarations (EPD)
- ISO 14060 – Net Zero

SOCIAL
3. Good Health and Wellbeing

- ISO 53001 – UN SDGs
- ISO 45001 – H&S
- ISO 45003 – Mental Health
- ISO 44001 – Collaborative Working
- ISO 37001 – Anti-bribery
- ISO 26000 – Social Responsibility
- FSC / PEFC
- RSPO

GOVERNANCE
9. Industry, Innovation and Infrastructure

- ISO 9001 – Quality
- ISO 22301 – BCMS
- ISO 27001 / 27701 / 27017 / 27018 – Info Sec
- ISO 55001 – Asset Management
- ISO 44001 – Collaborative Working
- ISO 41001 – Facilities Management
- Industry specifics
  - Aerospace
  - Medical
  - Food

R<THINK: web-based environmental software

A software with three solution:

- R<THINK LCA (Life Cycle Assessment)
- R<THINK Share
- R<THINK CCF (Corporate Carbon Footprint)

PART 1: LEARNING OBJECTIVES

1. Gain an overview of the context for carbon quantification, mitigation and reporting

2. Gain an overview of the drivers for carbon quantification, mitigation and reporting

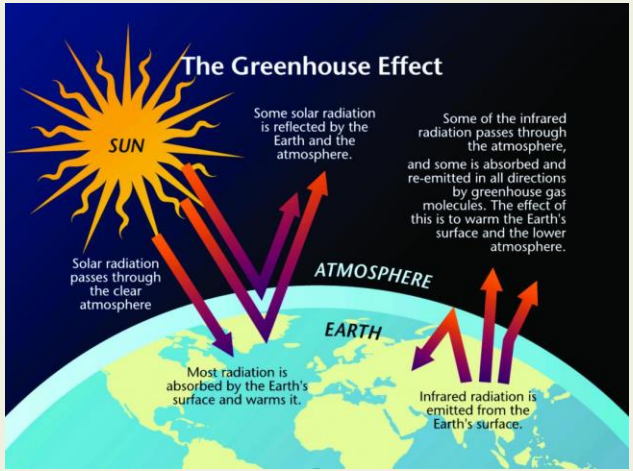
3. Understand the options you have for using standards and other methodologies for carbon quantification, mitigation and reporting

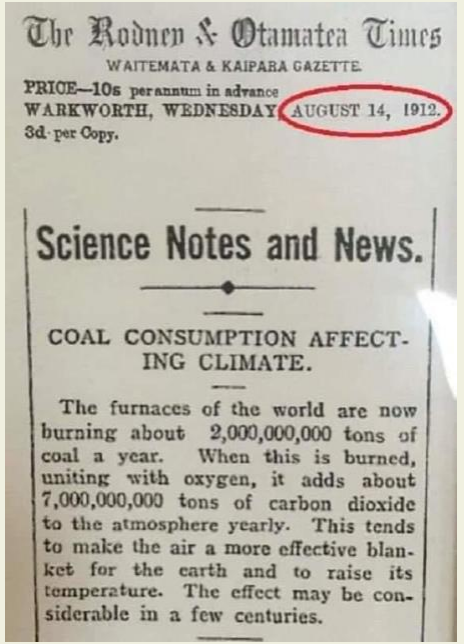
CONTEXT AND INTRODUCTION

WHAT DO WE MEAN BY GREENHOUSE GASES?

Greenhouse gases (also known as GHGs) are gases in the earth's atmosphere that trap heat. During the day, the sun shines through the atmosphere, warming the earth's surface. At night the earth's surface cools, releasing heat back into the air. But some of the heat is trapped by the GHGs in the atmosphere.

GHGs are both naturally occurring and occurring as a result of human activities.





The Rodney & Otamatea Times
WAITEMATA & KAIPARA GAZETTE.
PRICE—10s per annum in advance
WARKWORTH, WEDNESDAY AUGUST 14, 1912.
3d. per Copy.

Science Notes and News.

COAL CONSUMPTION AFFECTING CLIMATE.

The furnaces of the world are now burning about 2,000,000,000 tons of coal a year. When this is burned, uniting with oxygen, it adds about 7,000,000,000 tons of carbon dioxide to the atmosphere yearly. This tends to make the air a more effective blanket for the earth and to raise its temperature. The effect may be considerable in a few centuries.

WHAT DO WE MEAN BY GREENHOUSE GASES?

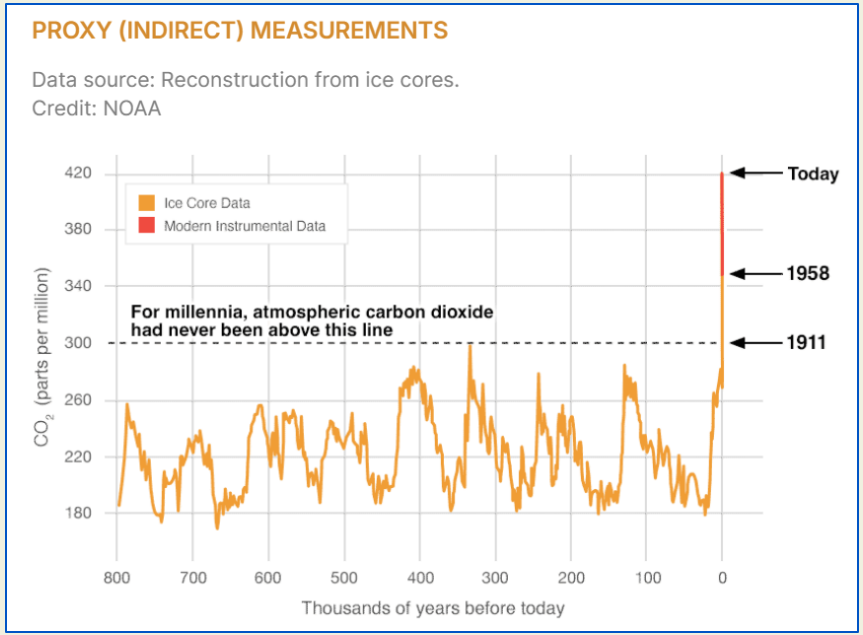
The Seven Kyoto Protocol GHGs.

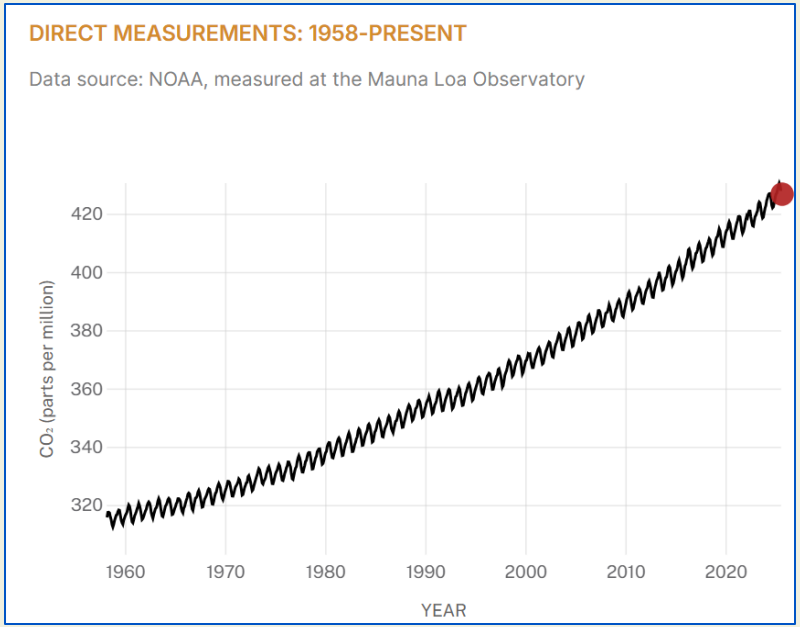
Greenhouse gas	Formula	Main origin	GWP_{100}	Global
Carbon dioxide	CO2	Fossil fuels	1	73%
Methane	CH4	Farming	25	20%
Nitrous oxide	N2O	Agriculture	298	4%
Hydrofluorocarbons	HFCs	Cooling systems	14800	0.75%
Perfluorocarbons	PFCs	Cooling systems	7390	0.75%
Sulphur hexafluoride	SF6	Electrical systems	22800	0.75%
Nitrogen trifluoride	NF3	Displays production	17200	0.75%

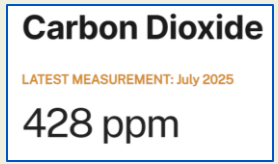
Showing:

- Main source / origin
- Their Global Warming Potential:
  - GWP allows comparisons of the global warming 'potency' of different gases. Specifically, it is a measure of how much energy the emissions of 1 ton of a gas will absorb over a given period of time, relative to the emissions of 1 ton of carbon dioxide (CO_2). The larger the GWP, the more that a given gas warms the Earth compared to CO_2 over that time period
  - This enables all GHG reporting to be produced in tCO_2e
- The global % of each: CO_2 is the most prevalent

GREENHOUSE GASES – HUMAN IMPACT





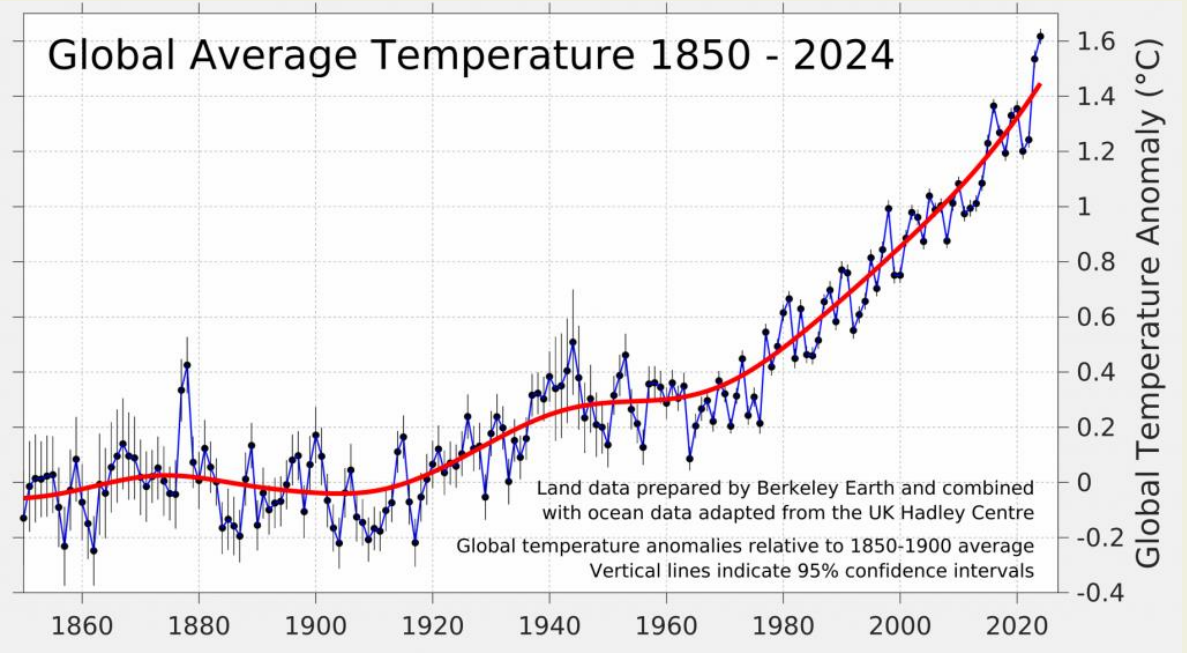


Source: https://climate.nasa.gov/vital-signs/carbon-dioxide

GREENHOUSE GASES – HUMAN IMPACT

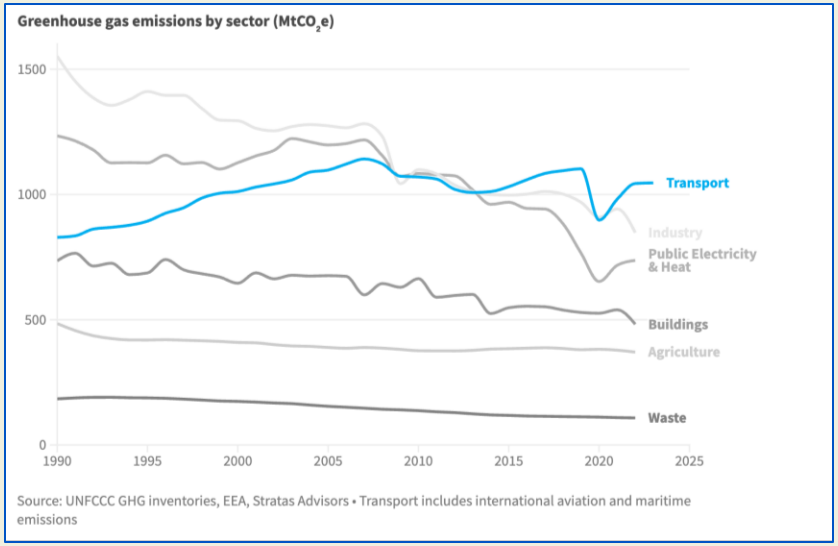
- The ‘Paris Agreement’: United Nations Framework Convention on Climate Change.

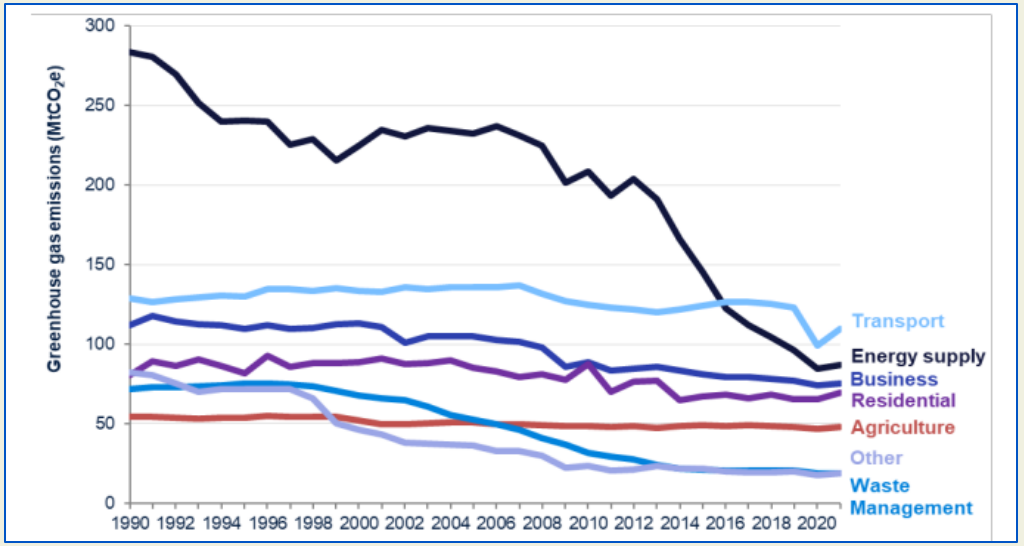
- The overarching goal is to hold ‘the increase in the global average temperature to well below 2degC above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5degC above pre-industrial levels.’



GREENHOUSE GASES – HUMAN IMPACT

EU and UK GHG Emissions by Sector





WHY IS GHG REPORTING IMPORTANT?

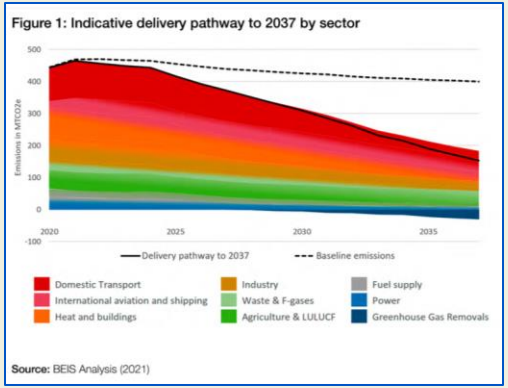
- Scientists agree that the most critical issue facing our planet is climate change
- The EU and the UK have committed to reach ‘Net Zero’ by 2050:
  - To limit global temperature increase, in keeping with Science Based Targets
- For most EU and UK companies and organisations, decarbonisation is currently being driven via:
  - To a lesser extent, various regulatory and policy changes
  - To a greater extent, supply chain pressures and stakeholder expectations
- This is leading many companies to make public commitments to be Net Zero

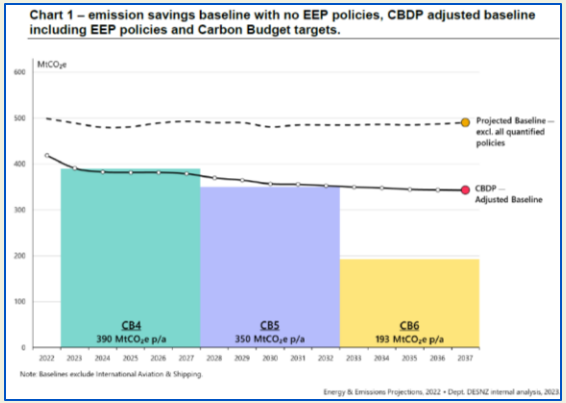
WHY IS GHG REPORTING IMPORTANT?

Progress in the UK:

- So far, so good: Carbon Budgets 1, 2 and 3 (2008 to 2022) have all been reported as achieved / exceeded

- From the projected baselines the UK Government's Energy and Emissions Projections (EEP) indicate that:
  - *Current* EEP Policies alone are projected to deliver the GHG emission savings needed as follows:
    - Carbon Budget 4, 2023 – 2027, expected to be achieved with 7 MtCO2e headroom (>100%)
    - Carbon Budget 5, 2028 – 2032, current projections indicate a 9 MtCO2e shortfall (~3%)
    - Carbon Budget 6, 2033 – 2037, current projections indicate a 199 MtCO2e shortfall (~60%), and relies significantly for the first time on GHG removals, as well as mitigations





WHY IS GHG REPORTING IMPORTANT?

- If you can't measure any of this as accurately as possible, then you probably can't manage it……

- There are various issues with the methodologies used to quantity GHG emissions, including:
  - In the EU and UK, we have some of the best sets of carbon conversion factors in the world. This is not always the case in other countries
  - The GHG Protocol Corporate Accounting and Reporting Standards do not yet provide for accounting for GHG removals – remains at pilot stage
  - Offsetting: carbon neutrality delivered via the Voluntary Carbon Market, including additionality
  - Double counting of indirect supply chain GHG emissions (Scope 3s)
  - Carbon leakage
  - 'Inventive / creative' carbon accounting

This necessitates the need for the adoption of standardised, international (ISO) approaches to GHG quantification and reporting

DRIVERS

DRIVERS

The drivers for companies and organisations to quantify, report and manage their GHG Emissions can be summarised as follows:

- Improved competitive advantage
- Regulatory compliance
- Reduced risks, including through supply chains

- Environmental improvement and long-term business sustainability

DRIVERS: COMPETITIVE ADVANTAGE

Improved Competitive Advantage:

- Many large organisations are actively encouraging / requiring their supply chains to quantify and report on GHG emissions, often through tenders and questionnaires. This could be due to their internal commitments and the need for supply chain information for their own GHG data

- GHG reporting is becoming and will continue to be a major factor in contract awards, for example in government contracts such as for healthcare, highways, infrastructure, defence

DRIVERS: COMPETITIVE ADVANTAGE

- **Example:**
  - Supplier questionnaires
  - A representative example from a multinational aerospace, defence and transportation company:

Field Label
Scope 1&2 emissions
A.1 Do you track your company's Scope 1 and Scope 2 greenhouse gas (GHG) emissions ?
A.2 If yes, is it in accordance with any international GHG Reporting Guidance?
A.3 If yes, is it in accordance with the International Aerospace Environmental Group (IAEG) GHG Reporting Guidance for the Aerospace Industry ?
A.4 Can you provide your company's Scope 1 and 2 GHG emissions in Carbon Dioxide equivalents (CO2e) in metric tonnes for the most recent available data?
A.5 Do you know the reporting year for Scope 1&2 GHG emissions ?
A.6 Does the data provided in A.4 are Scope 1&2 GHG emissions from the most recent available reporting year ?
Scope 3 emissions
A.7 Do you track your company's Scope 3 GHG emissions?
A.8 If yes, what are the Scope 3 GHG emissions categories that are tracked by your company ?
A.9 If yes, is it in accordance with any international GHG Reporting Guidance?
A.10 If yes, is it in accordance with the International Aerospace Environmental Group (IAEG) GHG Reporting Guidance for the Aerospace Industry ?
A.11 Can you provide your company's Scope 3 GHG emissions in Carbon Dioxide equivalents (CO2e) in metric tonnes for the most recent available data?
A.12 Do you know the reporting year for Scope 3 emissions ?
A.13 Does the data provided in A.11 are Scope 3 GHG emissions from the most recent available reporting year ?
GHG emissions verification
A.14 Have these GHG assessments from Scope 1,2&3 emissions been verified ?
A.15 If yes, please specify the level of verification
GHG emissions allocation
A.16 Please, allocate your GHG Emissions to [redacted] according to the goods or services you have sold in Carbon Dioxide equivalents (CO2e) in metric tonnes for the most recent available reporting year.
A.17 Describe the methodology used to allocate the emissions of products and services sold to Thales.

DRIVERS: COMPETITIVE ADVANTAGE

- **Example:**
  - Supplier questionnaires
  - A representative example from a multinational aerospace, defence and transportation company:

Field Label
GHG emissions reduction strategy and action plan
B.1 Do you have Scope 1& 2 carbon footprint reduction strategy for your company ?
B.2 If yes, what are the targets of the reduction strategy of your Scope 1 & 2 carbon emissions ?
B.3 Do you have Scope 3 carbon footprint reduction strategy for your products ?
B.4 If yes, what are the targets of the reduction strategy of your Scope 3 products carbon emissions ?
B.5 Does those carbon emissions reductions initiatives are in line with the Paris Agreement and/or Science Based Targets ?
B.6 Do you have any commitments to reduce the carbon emissions related to the products and/or services for [redacted] that you would like to share with us ?
B.7 Do you have any action plan to reduce the carbon emissions related to the products and/or services for [redacted] that you would like to share with us ?

DRIVERS: REGULATORY COMPLIANCE

Regulatory Compliance:

- The drive towards net zero has and will continue to result in a more challenging regulatory environment for companies, for example:
  - UK Energy Savings and Opportunities Scheme (ESOS) Regs 2014
  - UK Streamlined Energy and Carbon Reporting (SECR)
  - UK / EU Emissions Trading Scheme
  - UK Climate Change Agreements (CCA)
  - EU Corporate Sustainability Reporting Directive (CSRD)
  - EU / UK Carbon Border Adjustment Mechanism (CBAM)

DRIVERS: RISK REDUCTION

Reduced Risks (including through supply chains):

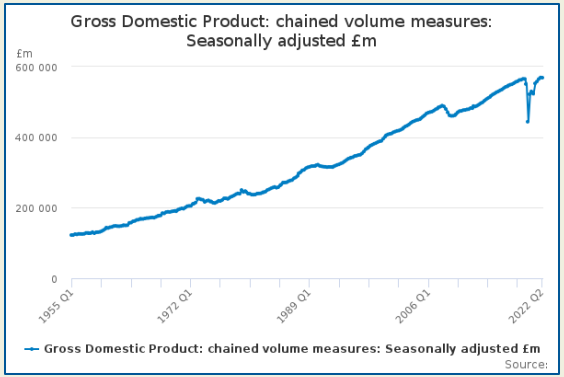
- Examples where GHG reporting impacts upon risk management include:
  - Financial investments / investors
  - Insurers
  - Avoidance of negative publicity /reputational risks: ‘Greenwashing’

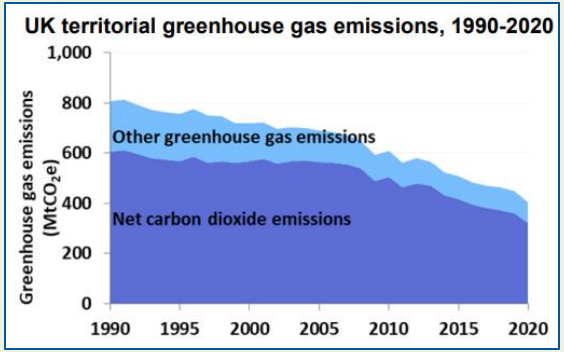
DRIVERS: ENVIRONMENTAL IMPROVEMENT / LONG-TERM BUSINESS SUSTAINABILITY

Environmental Improvement and Long-Term Business Sustainability:

- These drivers will only increase, through supply chain pressures, increased consumer awareness, investor considerations, Government regulations, and of course the increased frequency of climate related emergencies including supply chain disruption

- It is possible to reduce carbon and remain competitive
  - The UK has already reduced its GHG emissions by 42% between 1990 and 2020, whilst growing the economy by two thirds





OPTIONS FOR STANDARDS AND METHODOLOGIES TO USE

STANDARDS AND METHODOLOGIES: OPTIONS

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, providing for credibility and assurance

STANDARDS AND METHODOLOGIES: OPTIONS

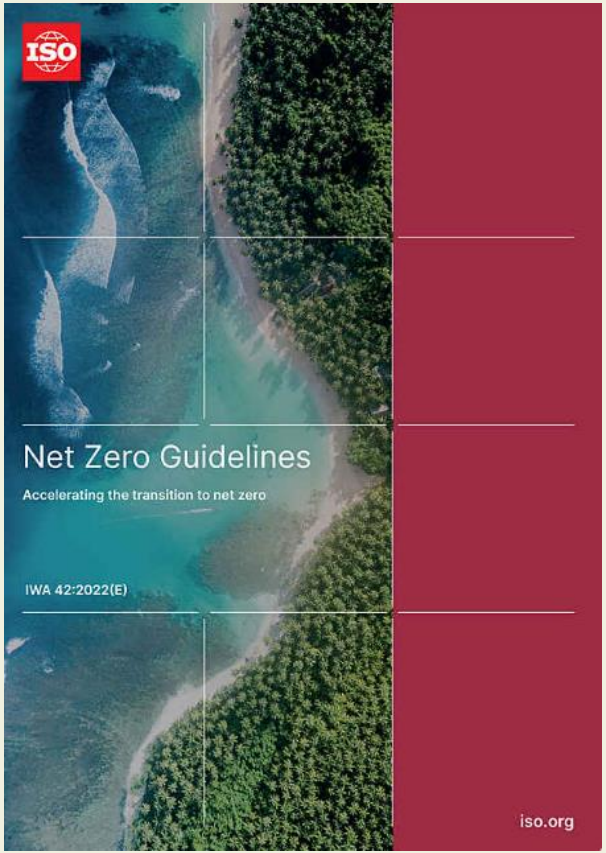
There are various sources of *standards / specifications* for quantifying, mitigating and reporting GHG emissions, depending on your needs:

- 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
  - ISO 14064-1 is a recognised basis as a step towards this
  - Allows for external, third party, Verification via Verification Bodies, providing for credibility and assurance

STANDARDS AND METHODOLOGIES: OPTIONS

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

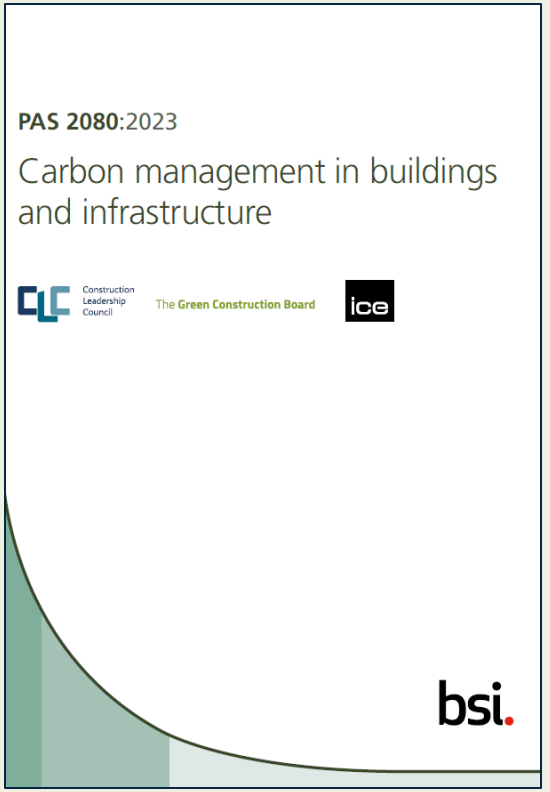
- ISO 14060: net zero aligned organisations
  - Not yet published - pending
  - Internationally recognised, highest tier of standards (ISO)
  - Provides a framework for aligning with net zero targets
  - ISO 14064-1 is a recognised basis as a step towards this
  - Allows for external, third party, Verification via Verification Bodies, providing for credibility and assurance



STANDARDS AND METHODOLOGIES: OPTIONS

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

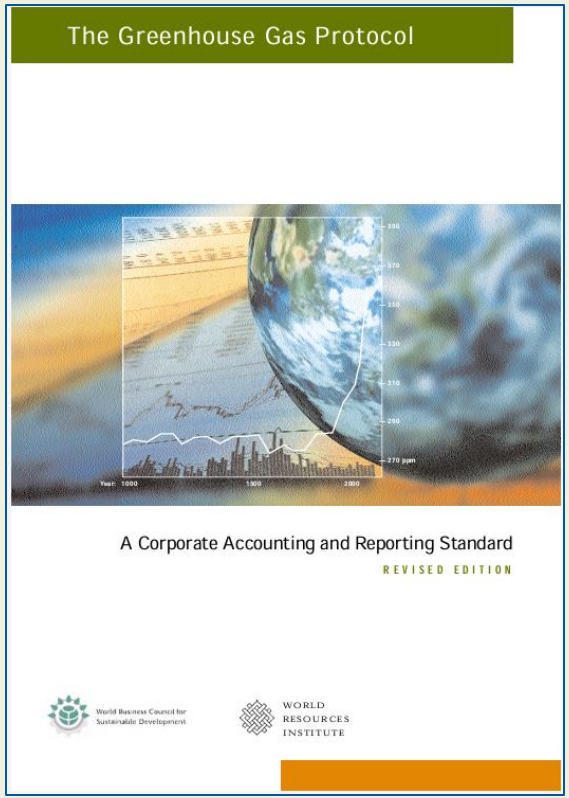
- PAS 2080: carbon management in buildings and infrastructure
  - Developed in the UK, but internationally recognised
  - Provides a framework for managing (not calculating), whole life carbon in buildings and infrastructure
  - Intended for application in the construction industry
  - Allows for external, third party, Verification via Verification Bodies, providing for credibility and assurance



STANDARDS AND METHODOLOGIES: OPTIONS

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 calculating Scope 1, 2 and 3 activities
  - Does not provide conversion factors
  - https://ghgprotocol.org/



STANDARDS AND METHODOLOGIES: OPTIONS

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

- UK Government (DESNZ) Carbon Conversion Factors and UK Environmental Reporting Guidelines:
  - Scope 1, 2 and 3 activities, https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2024
  - It is rare for Scope 3 EFs to be available internationally. Many companies will use the UK Government ones

- Scope 2 Conversion Factors are widely available for many countries and differ hugely as fuel mix for electricity generation varies, eg:
  - France (primarily nuclear); UAE (primarily oil); Norway (primarily hydro); USA / Australia (continue to use coal)

STANDARDS AND METHODOLOGIES: OPTIONS

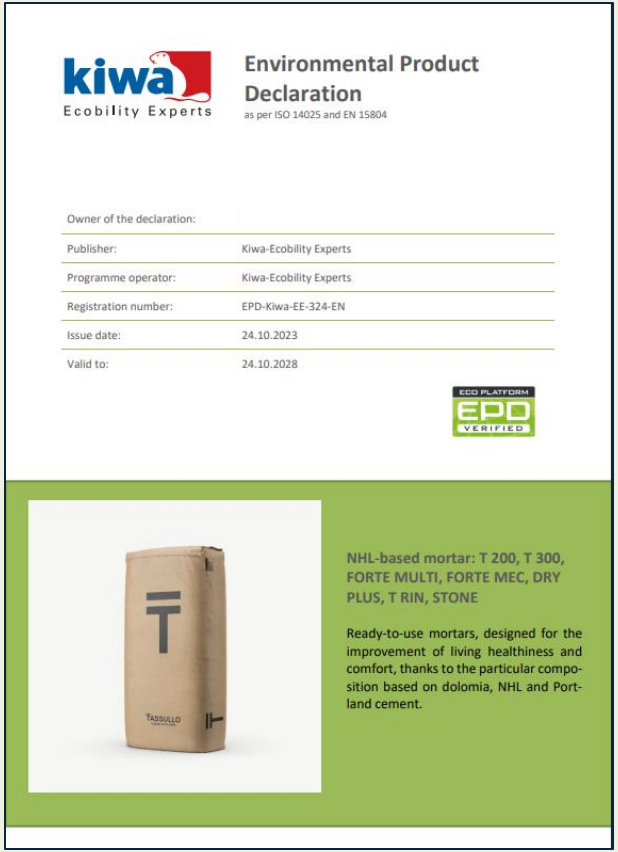
There are various sources of methodologies for calculating and quantifying GHG emissions, depending on your needs, for example:

- Country specific (almost all countries) EFs are available for electricity and heat from: https://www.iea.org/data-and-statistics/data-product/emissions-factors-2024#emission-factors; https://www.trackingstandard.org/i-rece-residual-mix/; https://www.aib-net.org/facts/european-residual-mix/2024
- EU specific EFs are available from the European Environment Agency for electricity only: https://www.eea.europa.eu/en/analysis/indicators/greenhouse-gas-emission-intensity-of-1
- US specific (by state) EFs for electricity only: https://www.epa.gov/egrid
- Republic of Ireland specific EFs for electricity only: https://www.seai.ie/data-and-insights/seai-statistics
- France specific EFs: https://www.rte-france.com/; https://bilans-ges.ademe.fr/
- Netherlands spcific EFs: https://english.rvo.nl/sites/default/files/2024-07/The-Netherlands-list-of-fuels-January-2024.pdf
- Germany spcific EFs: Emissionsbilanz erneuerbarer Energieträger

STANDARDS AND METHODOLOGIES: OPTIONS

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

- Other sources, for example:
  - Environmental Product Declarations (EPDs) are verified and registered documents of a product's life cycle analysis
  - The Inventory of Carbon and Energy (the ICE database): an embodied carbon database for construction materials: https://www.ice.org.uk/
  - Often when faced with difficult to covert activities, there may be peer reviewed scientific papers available which can help

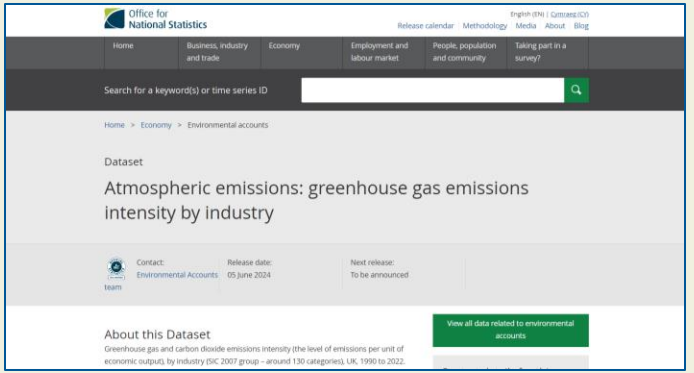


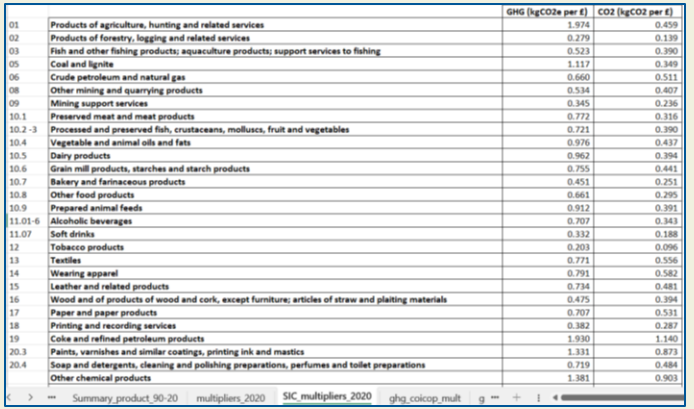
STANDARDS AND METHODOLOGIES: OPTIONS

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

- Other sources, for example:
  - 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_2019.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

Spend based EFs are widely available from government websites, eg China, USA, EU, UK - but should be used only as a last resort





		GHG (kgCO2e per £)	CO2 (kgCO2 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
11.01-6	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	0.734	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	0.484
	Other chemical products	1.381	0.903

Summary_product_90-20 | multipliers_2020 | SIC_multipliers_2020 | ghg_coicop_mult

NEXT TIME

PART 2, 22/08/2024, GETTING STARTED ON YOUR CARBON REPORTING

- **Part 2, 18/09/2025, Getting Started on your GHG Reporting:**
  - Defining your organisational and reporting boundaries
  - Selecting and using appropriate standards and methodologies
  - Using Conversion Factors
  - Establishing baselines
  - Calculating your Scope 1, 2 and 3 GHG Emissions
  - Preparing a GHG Inventory
  - Determining Materiality

Scan the QR code to register:

- **Part 3, 24/10/2025, 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

Scan the QR code to register:

kiwa

THANK YOU!

de.sustainability@kiwa.com

Kiwa-Ecobility Experts

kiwa

Q&A