Department for Energy Security & Net Zero

Technical consultation: A policy framework to grow the market for low carbon industrial products

Closing date: 15 September 2025

June 2025

Any enquiries regarding this publication should be sent to us at:
consultation.lowcarbonproducts@energysecurity.gov.uk

Foreword

We are determined that the future is made and built in Britain. Net zero is the economic and industrial opportunity of the 21st century, essential to driving growth and creating good jobs. This is a chance to boost the UK's competitiveness, exports, and innovation, reindustrialising Britain as we unlock investment in wind, nuclear, networks, hydrogen, and CCUS. This in turn supports the Prime Minister's Mission to make the UK a clean energy superpower through delivering clean power by 2030 and accelerating to net zero.

The UK is already leading the way in building a greener, more competitive, and sustainable economy, as well as reaping the economic benefits of our drive to net zero. The UK's net zero economy is growing more than three times faster than the economy as a whole, and according to the CBI these net zero jobs that are 15% better paid and 40% more productive than the national average. The transition will support hundreds of thousands more good jobs with decent wages and strong trade unions by the end of the decade. Industrial decarbonisation is vital to future-proofing industry, securing jobs in our foundational sectors, and driving productivity and efficiency gains.

If we fail to in these critical years, we will lose out in the global race for the jobs and industries of the future. However, businesses need long term confidence and certainty that decarbonisation will be commercially viable to make the necessary investments. That is why the government is consulting on a framework to deliver the guidance, tools, and levers to help buyers identify and compare lower carbon products.

Our industrial sectors are a key driving force for change. It is imperative that businesses across the supply chain come together to realise the full economic potential of the low carbon market. Organisations like the Construction Leadership Council (CLC) are already showing what is possible, bringing together leaders across the construction sector to drive demand. To truly shift the market and create real change, UK businesses must be bold and choose to buy low carbon.

The UK is not acting alone. For years, we have led international discussions and collaboration on shared challenges, from improving carbon accounting to defining low carbon products. At COP26 we co-founded the Industrial Deep Decarbonisation Initiative (IDDI) with India, bringing together global partners to accelerate climate action to support industry to decarbonise. At COP28, we strengthened our commitment further by signing the IDDI's Green Procurement Pledge.

Working together at home with industry and abroad with international partners, we can use the net zero transition to foster a prosperous low carbon future for the UK.

SARAH JONES MP

Minister of State for Energy Security and Net Zero

General information

Why we are consulting

The Department for Energy Security and Net Zero is seeking views on policies to grow the market for low carbon industrial products with an initial focus on steel, cement, and concrete products used in construction. This follows the 2023 Carbon Leakage consultation,[1] where the government committed to establish an embodied emissions reporting framework and product classifications (formerly called voluntary product standards).

This consultation is the next step in the development of the low carbon product market policies, which proposes the combination of product classifications, an embodied emissions reporting framework and product level green procurement policies for low carbon industrial products. It also examines future policies the government could consider in addition to this framework, including ecolabelling and mandatory product standards.

Respondents are invited to provide their views on the full document or only on sections they deem relevant to their organisation.

This consultation is designed to gather views and evidence from stakeholders to facilitate the policy making process and does not constitute a statement of government policy. Following this consultation, further policy development will be needed before new policies are finalised. The government will continue engagement with stakeholders throughout this process.

Consultation details

Issued: 23 June 2025

Respond by: 15 September 2025

Enquiries to: The Low Carbon Products Team, 3 Whitehall Pl, London, SW1A 2AW

Email: consultation.lowcarbonproducts@energysecurity.gov.uk

Consultation reference: Technical consultation: A policy framework to grow the market for low carbon industrial products

Audiences: This consultation will be of particular interest to stakeholders involved in the manufacture, sale or purchasing of in-scope products such as steel, cement, and concrete or stakeholders involved in the production and usage of life cycle assessments displayed in product carbon footprints or environment product declarations.

Territorial extent: This consultation seeks information for consideration by the UK Government.

Supporting information: Further information regarding the emissions reporting framework and product classifications can be found in the technical annex.

[1] UK Government, 2023, 'Addressing carbon leakage risk to support decarbonisation'

How to respond

Respond online at: https://energygovuk.citizenspace.com/energy-security/framework-to-grow-market-for-low-carbon-industrial

Email to: consultation.lowcarbonproducts@energysecurity.gov.uk

Write to: Low Carbon Product Team, 3 Whitehall Pl, London, SW1A 2AW

When responding, please state whether you are responding as an individual or representing the views of an organisation.

Your response will be most useful if it is framed in direct response to the questions posed, though further comments and evidence are also welcome.

Confidentiality and data protection

Information you provide in response to this consultation, including personal information, may be disclosed in accordance with UK legislation (the Freedom of Information Act 2000, the Data Protection Act 2018 and the Environmental Information Regulations 2004).

If you want the information that you provide to be treated as confidential, please tell us, but be aware that we cannot guarantee confidentiality in all circumstances. An automatic confidentiality disclaimer generated by your IT system will not be regarded by us as a confidentiality request.

We will process your personal data in accordance with all applicable data protection laws. See our privacy policy.

We will summarise all responses and publish this summary on GOV.UK. The summary will include a list of names or organisations that responded, but not people's personal names, addresses or other contact details.

Quality assurance

This consultation has been carried out in accordance with the government's consultation principles.

If you have any complaints about the way this consultation has been conducted, please email: bru@energysecurity.gov.uk.

Introduction

The clean energy revolution represents a once-in-a-generation opportunity to redefine our industrial landscape. The creation of a resilient market for low carbon 'industrial products'[2] is key for supporting UK industry in its transition towards a sustainable future and helping achieve the UK's net zero target by 2050. Low carbon industrial steel, cement, and concrete[3] products ('low carbon products') used in construction are not only vital components of the economy but could also help drive transformative change in industrial decarbonisation while supporting the government's growth mission. With 80% of global GDP now covered by net zero targets, the long-term viability of industrial exporters hinges on their ability to decarbonise.

Current complexities in the system mean it is difficult for businesses who invest in low carbon solutions to demonstrate the environmental credentials of their products to potential interested buyers. It is difficult for buyers to access reliable, comparable information on embodied emissions of industrial products that can be taken into account in purchasing decisions. These proposals intend to address these information failures to unlock growth in the market for low carbon products.

In 2023, the Department for Energy Security and Net Zero and His Majesty's Treasury published the consultation 'Addressing carbon leakage risk to support decarbonisation' ('the previous consultation').[4] In its response, ('the previous government response'[5]), the government announced plans to work with industry to establish product classifications (formerly voluntary product standards) and develop an embodied emissions reporting framework (EERF), alongside the announcement of a UK Carbon Border Adjustment Mechanism (CBAM) by 2027.[6] The previous consultation also explored broader low carbon product market policies including green procurement, ecolabelling, and mandatory product standards (MPS).

While significant progress has been made in developing low carbon technologies and practices,[7] market inefficiencies and limited awareness among buyers continue to hinder demand for low carbon products. For example, there is currently no single agreed methodology for measuring the embodied carbon of industrial products, and multiple definitions of 'low carbon' create confusion.

The key low carbon product market policies, which are outlined in this consultation, seek to address existing inefficiencies and information failures by enhancing clarity, standardisation,

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[2] Manufactured materials and components that are intermediate, rather than final products.

[3] In this consultation, the sector scope for industrial products is focussed on steel, cement and concrete due to their emissions intensive nature and ubiquitous use in our economy (see page 13 for more on sector scope).

[4] UK Government, 2023, 'Addressing carbon leakage risk to support decarbonisation'.

[5] UK Government, 2023, Summary of responses and government response to the UK carbon leakage consultation'.

[6] Which the UK Government further consulted on in 2024: Consultation on the introduction of a UK carbon border adjustment mechanism

[7] Examples include: CEMCOR in Northern Ireland developed CalcinX, a low carbon cement that cuts emissions by using calcinated clay with lower heat treatment requirements and CELSA Steel UK in Cardiff uses an Electric Arc Furnace to produce steel with 86% fewer emissions compared to ore processed steel making, with 98% of its product made from recycled material.

and access to reliable emissions information. By increasing demand, the framework can help further reduce emissions, attract investment in greener technologies and accelerate decarbonisation across key industrial sectors.

The government has a unique role in helping grow the market for low carbon products, which includes instilling industry confidence in the profitability of decarbonisation. By supporting producers in decarbonising industrial production, the government can provide long term certainty. Strengthening the low carbon product market could also encourage UK businesses to invest more in innovative low carbon solutions, attract international investors, and enhance economic resilience, leading to sustained improvements in productivity.

This consultation is the next step in developing the proposed low carbon product market policies. It seeks to address three fundamental issues:

i) How to measure, report and verify the emissions of that product (through an EERF)
ii) How to define a low carbon product (through product classifications)
iii) How to encourage the use of this information to inform greener purchasing decisions

Recognising the global nature of industrial product trade, the government's ambition for a strong low carbon market extends beyond the UK. Any adopted policies will adhere to the UK's international commitments, including World Trade Organisation obligations, while collaborating with global partners to develop comparable and interoperable policies, where possible. This collective effort can help realise the benefits of a competitive, low carbon global economy.

Proposed framework and sequencing of policies

This consultation seeks feedback on technical policy options that, when developed and implemented together, will form a cohesive set of low carbon product market policies. It focusses on key policies and components proposed in the initial phase of the framework, which could be scaled up or expanded in the future (see Chapter 7), subject to further consultation.

Note that this framework is being proposed on a voluntary basis, at least in the first instance. Any decision to make some or all elements mandatory in future would be subject to further stakeholder engagement.

The key policies prioritised in the initial phase of the framework are:

- **Chapters 2 to 4: The embodied emissions reporting framework (EERF):** Aims to help producers and buyers of industrial products measure, report, and verify emissions for eligible products. Initial EERF proposals include: 1) guidance for carbon accounting and 2) an IT system that includes databases to streamline reporting, making it more affordable, accessible, and transparent.
- **Chapter 5: Product classifications:** Aims to help define low carbon steel, cement, and concrete by establishing a model or models that would categorise products based on their embodied emissions. This would set thresholds for different levels of emissions intensity (such as A to G ratings), helping buyers understand and compare the climate impact of their purchases. All product classifications require embodied emissions data.

Product classifications can also provide a foundation for product level green procurement by enabling buyers to set contract specifications or organisation level commitments (such as to buy class D steel from 2030).

- **Chapter 6: Product level green procurement:** Aims to encourage organisations to consider the embodied emissions of products purchased in their procurement processes. This is proposed through government led guidance, which could initially outline best practice recommendations. Best practice guidance could be expanded to help organisations determine which products should (and should not) be procured.

Chapter 7 then explores other policies that could be introduced in the longer term to support or complement those above, which includes product ecolabelling and mandatory product standards (MPS). The government is also considering whether these low carbon product market policies could be expanded to other sectors beyond steel, cement, and concrete, and whether any other policies should be explored, such as buyers' alliances.

When implementing these low carbon product market policies, the government will account for factors beyond embodied carbon, such as product longevity, performance, and the ability to repair, reuse, repurpose, or recycle. These considerations contribute to overall sustainability and support the transition to a circular economy. Although broader sustainability factors are not the focus of this consultation, the government invites stakeholder input on how the policies in this consultation might conflict with, or complement, other elements that could influence buyer decisions.

Related policies

These low carbon product market policies will work with broader government strategies and policies to address the challenges and opportunities of industrial decarbonisation.

Strategies such as the Industrial Decarbonisation Strategy,[8] Circular Economy Strategy,[9] and the future Steel Strategy[10] work to make UK industry more sustainable. The Industrial Decarbonisation Strategy focusses on creating a competitive, low carbon industrial base, the Circular Economy Strategy promotes resource efficiency and green growth, and the Steel Strategy aims to secure a greener future for steelmaking. Additionally, policies like Construction Products Reform (CPR),[11] and the Industrial Deep Decarbonisation Initiative (IDDI)[12] target specific goals, such as improved construction product reporting (CPR), and green procurement to meet COP28 commitments (IDDI).

[8] UK Government, 2021, 'Industrial decarbonisation strategy'

[9] UK Government, 2024, 'Circular Economy Taskforce'

[10] UK Government, 2025, 'The steel strategy: the plan for steel'

[11] UK Government, 2025, 'Construction Products Reform Green Paper'

[12] The United Nations Industrial Development Organisation, 'IDDI'

Carbon leakage and the UK CBAM

The previous consultation proposed policies to address carbon leakage, ensuring UK industry can invest in decarbonisation without being undercut by higher carbon imports.[13] The UK Emissions Trading Scheme (ETS), the UK's main carbon pricing policy instrument, addresses carbon leakage by allocating free allowances. Starting in 2027, the UK CBAM, which was announced in 2023 as part of the government response to the previous consultation, will introduce a carbon price on certain imported goods. This will ensure that overseas carbon intensive products face a carbon price comparable to that applied to UK produced goods, preventing possible emissions displacement and supporting global emissions reductions.[14]

The low carbon product market policies offer additional support for mitigating carbon leakage, and its role in addressing carbon leakage will be reviewed as policies evolve. Future low carbon product market policy development will explore possible alignment between the embodied emissions reporting framework (EERF) proposed in this consultation and other monitoring, reporting, and verification (MRV) systems, including UK CBAM. The government will continue to keep under review how to maximise alignment and explore opportunities to streamline reporting where possible and desirable in the future.

Stakeholder engagement

In addition to evidence gathered from the previous consultation and the 2021 call for evidence 'Towards a market for low emissions industrial products',[15] the government has further developed the low carbon product market policies through extensive engagement with stakeholders, including industry, academia and think tanks.[16] This has involved technical workshops, bilateral meetings, and ongoing discussions to gather insights and inform decision making.

The government has also prioritised collaboration with international partners, drawing on global best practices and exploring alignment with established international frameworks and organisations such as the International Energy Agency (IEA) and IDDI. Through regular participation in international fora such as the IDDI's working groups and the IEA's Working Party on Industrial Decarbonisation, policy proposals in this consultation have been tested on a global stage.

[13] Carbon leakage is the movement of production and emissions from one country to another due to different levels of decarbonisation effort.

[14] The UK CBAM will apply to the following sectors: aluminium, cement, fertilisers, hydrogen, iron and steel. See Annex B of 'Introduction of a UK Carbon Border Adjustment Mechanism from January 2027: Government response to the policy design consultation' for further details.

[15] Towards a market for low emissions industrial products: call for evidence - GOV.UK

[16] Including ConcreteZero, the Construction Leadership Council (CLC), Decerna, Innovate UK (UKRI), the Mineral Products Association (MPA), Transport for London (TfL), WorldSteel and UK Steel.

Devolution

The government is committed to ensuring an aligned and coherent approach to growing the market for low carbon products and supporting industrial decarbonisation across the whole of the UK. The proposed low carbon product market policies set out in this consultation have been shared with the Scottish Government, Welsh Government and Northern Ireland Executive. As the policies in this consultation propose an initial voluntary approach, the risks of misalignment between nations are largely mitigated. The government will continue to engage extensively with the devolved governments throughout every stage of policy development following this consultation. Any potential transition to mandatory policies would require further work and consultation, and the government is committed to close collaboration with the devolved governments to shape and refine such policies, should they be pursued in the future.

Chapter 1: Cross-cutting considerations

This chapter explains the rationale for selecting steel, cement, and concrete as the initial sectors in scope of these low carbon product market policies. It introduces proposed assessment criteria to guide the evaluation and selection of policy options for the framework. These criteria are designed to incentivise decarbonisation, facilitate product comparison, ensure robust and comprehensive measurement, guarantee operational readiness, and minimise burdens.

This chapter also seeks opinions on whether the government should address core environmental impacts beyond Global Warming Potential (GWP), such as water usage, in its policies. It concludes with questions exploring the potential impact of these policies and current industry practices.

Sector scope

In the previous government response, the government outlined plans to prioritise product classifications for the steel, cement, and concrete sectors (see Part 1 of Technical Annex for more detail). This decision was informed by criteria set out in the previous consultation, which received strong support from respondents: (i) exposure to carbon leakage risk, (ii) impact on industrial decarbonisation and net zero, (iii) deliverability, and (iv) international alignment.

To develop more detailed policy options presented in this consultation, it was necessary to establish an agreed sector scope for these low carbon product market policies. Practices for measuring product level emissions are notably more developed in the construction sector compared to others.[17] As a result, the government has decided to focus on steel, cement, and concrete products in construction as the initial sectors for the low carbon product market policies. Options for expanding the sector scope will be explored in the future, with preliminary ideas outlined in Chapter 7.

The importance of in-scope sectors

Steel: The UK produced around 6m tonnes of crude steel,[18] with the iron and steel sector contributing £2.7bn in GVA[19] and 38,000 jobs, in 2022.[20] Steel is critical to modern economies, playing a key role in construction, infrastructure, transport, machinery, and consumer goods. The sector was responsible for 10.5MtCO2e emissions in 2022, or 15% of UK industrial emissions.[21]

[17] Such as a recommended carbon accounting methodology not being applicable to the types of products they are seeking to purchase.

[18] UK Steel, 2024, 'Key Statistics Guide May 2024'

[19] ONS, 2024 Low-level aggregates of UK output gross value added (GVA)

[20] ONS, 2024 JOBS03: Employee jobs by industry, JOBS04: Self-employment jobs by industry and Employees in Great Britain : 2023, DESNZ Internal analysis

[21] DESNZ, 2024 Final UK greenhouse gas emissions national statistics: 1990 to 2022

Cement: The cement sector plays a vital role in the UK economy, producing 7.7m tonnes of material crucial for building homes and national infrastructure.[22] It generates around £200m in GVA annually[23] and directly provides 1,100 jobs.[24] In 2022, the sector was responsible for 6 MtCO2e emissions, or 9% of UK industrial emissions.[25]

Concrete: Globally, concrete accounts for around 8% of CO2 emissions.[26] Cement, a key component of concrete, contributes up to 90% of concrete's emissions[27], primarily due to the energy-intensive clinker production process.

Assessment criteria for policy options

To assess and compare policy options effectively, the government has developed a specific set of criteria for the low carbon product market policies based on the principles of Multi-Criteria Decision Analysis (MCDA).[28] The 'assessment criteria' are outlined below and serve as guiding principles for selecting policy options and conducting an initial qualitative review of their potential advantages and disadvantages, where applicable.

The assessment criteria draw on the International Energy Agency (IEA)'s principles for definitions and net zero measurement.[29] Respondents are invited to share their views on the suitability of these criteria as part of this consultation.

[22] UK Government, 2025 'Construction building materials: commentary January 2025'

[23] ONS, 2025 GDP output approach – low-level aggregates, DESNZ internal analysis

[24] ONS, 2024 JOBS03: Employee jobs by industry, JOBS04: Self-employment jobs by industry and Employees in Great Britain : 2023, DESNZ Internal analysis

[25] DESNZ, 2024 Final UK greenhouse gas emissions national statistics: 1990 to 2022

[26] Climate Group and Ramboll, 2024, 'The Steel and Concrete Transformation: 2024 market outlook on lower emission steel and concrete report, Sep 2024'

[27] LCCG and the Green Construction Board, 2022, 'The Low Carbon Concrete Routemap'

[28] This method evaluates multiple essential criteria for decision making to ensure a comprehensive and balanced assessment while considering trade-offs. For complex decisions, a hierarchy of primary criteria (to represent main factors) and sub-criteria (to represent a detailed breakdown of the primary criteria) is helpful. These criteria form part of a structured framework for decision-making. Government Analysis Function, 2024, 'An Introductory Guide to Multi-Criteria Decision Analysis (MCDA)'

[29] IEA, November 2024, pg. 13-16, 27-28, 'IEA Definitions for near zero and low emissions steel and cement and underlying emissions measurement methodologies'

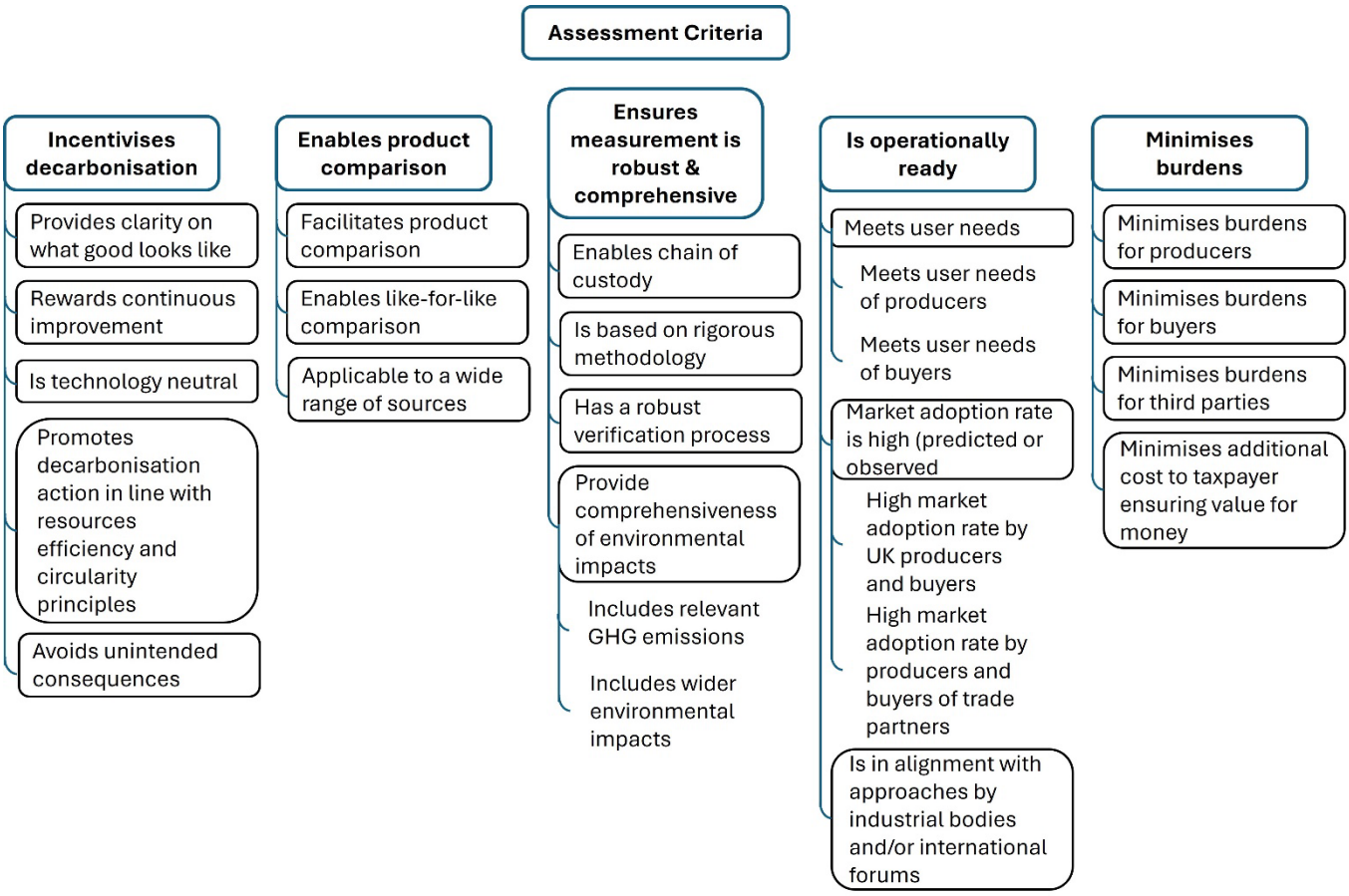

Figure 1: Summary of proposed assessment criteria

The proposed assessment criteria have been split into five primary criteria:[30]

Criterion 1: Incentivises decarbonisation

- **Provides clarity on what good looks like:** Defines clear benchmarks and specific indicators of success
- **Rewards continuous improvement:** Any reductions in embodied emissions across the value chain are recognised and reflected in data and scoring, with increased reward for larger improvements
- **Technology neutral:** Encourages a broad range of decarbonisation approaches, including energy efficiency, resource efficiency, renewable energy, fuel switching, and carbon capture, utilisation, and storage (CCUS), without favouring any specific production pathway
- **Promotes decarbonisation action in line with resource efficiency and circularity principles:** Encourages producers to maximise process efficiencies, reduce waste, and design products that use fewer materials

[30] Not ordered by importance.

- **Avoids unintended consequences:** Ensures decarbonisation measures do not cause negative side effects or increase emissions elsewhere. For instance, embodied carbon policies must be compatible with solutions that seek to reduce the whole life cycle emissions of a product or value chain, while minimising risks such as resource shuffling. Equally, longevity and resilience of chosen materials are important to consider, such as their ability to withstand future environmental conditions

Criterion 2: Enables product comparison

- **Facilitates product differentiation:** Effectively differentiates products based on their embodied emissions content, illustrating the distribution and variation between products
- **Enables like-for-like comparison:** Supports comparison of embodied emissions across different product categories while considering variations in production requirements. For instance, in comparing different steel products, the system boundary could be set up to a common production point (i.e. crude steel). Alternatively, separate thresholds could also be established for different product types (i.e. flat steel and long steel) to reflect differences in chemical compositions and production needs
- **Applicable to a wide range of products:** Covers a broad spectrum of products within the policy scope, enabling extensive comparisons and informed decision making, such as assessing steels with varying alloy content or cements with differing strengths

Criterion 3: Ensures measurement is robust and comprehensive

- **Enables chain of custody:** Tracks products throughout their supply chain, documenting greenhouse gas (GHG) emissions at each production stage. This ensures transparency and accountability in embodied emissions reporting across the value chain
- **Based on a rigorous methodology:** Adheres to clear standards, ensuring precision, consistency, and reproducibility of results. Where possible maximises use of primary data
- **Has a robust verification process:** Includes verification by independent, experienced and accredited verifiers, following established standards to ensure the accuracy, consistency, and validity of emissions data
- **Provides comprehensiveness of environmental impacts:** Addresses relevant environmental impacts across the product's value chain, including its use and disposal stages. This may include GHG emissions and broader environmental considerations, where appropriate

Criterion 4: Operationally ready

- **Meets needs of buyers and producers:** Designed to address the requirements of buyers and producers, offering solutions that facilitate and encourage effective usage
- **Market adoption rate is high (predicted or observed):** Significant (expected) uptake by market participants within the UK and internationally

- **Aligns with approaches by industrial bodies and/or international forums:** Alignment with approaches adopted by organisations such as the Mineral Products Association (MPA), UK Steel, and the IDDI

Criterion 5: Minimises costs

- **Minimises burdens for producers, buyers, and third parties:** Reduces additional costs by utilising existing data, frameworks, and mechanisms, or by providing tools to ensure compliance with policy option
- **Minimises additional costs to the taxpayer ensuring value for money:** Ensures costs are proportionate to benefits, maximising net value for taxpayers

1.1 Please indicate how relevant you think each primary assessment criterion is and explain your reasoning as well as any additional views, including whether there are other criteria not listed that should be included when considering policy options.

Primary criterion 1: Incentivises decarbonisation
Primary criterion 2: Enables product comparison
Primary criterion 3: Ensures measurement is robust and comprehensive
Primary criterion 4: Operationally ready
Primary criterion 5: Minimises costs

For each option - [Very relevant; Quite relevant; Moderately relevant; Slightly relevant; Not at all relevant]

[Open text]

Measuring environmental impacts

The government's policies, at a minimum, recommend recording the carbon dioxide equivalent (CO2e) emissions associated with the production of steel, cement, and concrete products in construction. However, as a secondary objective, recording and reporting on other significant environmental impacts could be beneficial. For instance, Environmental Product Declarations (EPDs) provide information on broader 'core environmental impacts', which go beyond product carbon footprints that focus solely on CO2e emissions.[31] Core environmental impacts beyond Global Warming Potential (GWP), expressed in carbon dioxide equivalent, include:[32]

[31] See, for instance: 'Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products' EN15804 Table 3 - Core environmental impact indicators. The core additional environmental impacts are required, and the additional environmental impacts (table 4) are optional.
[32] Note in the EPD format GWP is the environmental impact and CO2e the measure or expression of that impact.

- Ozone depletion
- Acidification, particularly ocean acidification, has a range of negative effects on marine life
- Eutrophication affects freshwater, marine, and terrestrial ecosystems by causing excessive nutrients accumulation in a body of water, resulting in an increased growth of organisms that may deplete the water's oxygen levels
- Photochemical ozone formation occurs as a result of high concentrations of ground-level ozone, which can damage vegetation, human respiratory tracts and manmade materials through reaction with organic materials[33]
- Depletion of abiotic (non-biological) resources including minerals, fossil fuels, and metals reduces the availability of essential raw materials. Sustainability information for rare minerals and metals used in manufacturing can be useful for buyers
- Water use
- Hazardous, non-hazardous waste and radioactive waste[34]

While balancing the cost of engaging with these policies for producers, the government acknowledges that reporting on broader environmental impacts could be beneficial for buyers of industrial products.

1.2 Which environmental impacts should the government consider at this stage in its policies? Please explain your reasoning.

Option 1: Global Warming Potential only (expressed in carbon dioxide equivalent)
Option 2: Global Warming Potential and some environmental impacts and waste categories relevant to the production of steel, cement, and concrete (please specify)
Option 3: Global Warming Potential and all the other core environmental impacts listed above
Option 4: Other (please specify)

[Open text]

Impacts and respondents' current practices

This section seeks input on potential impacts to consider when designing the low carbon product market policies and aims to understand current industry practices. Please respond if you produce and/or buy industrial steel, cement, and/or concrete products.

[33] European Commission, 2021, 'Photochemical ozone formation'

[34] EN15804 Table 7 Other environmental information describing waste categories.

1.3 Considering the objectives of this policy framework, to grow the market for low carbon products, which of the following do you think will be impacted? Please explain your reasoning with reference to specific policies.

Option 1: Large and multinational enterprises
Option 2: Small and medium enterprises, and/or micro businesses
Option 3: UK end consumers
Option 4: International trade
Option 5: Other (please specify)

For each option - [Strong positive impact; Moderate positive impact; Neutral impact/Depends on the situation; Moderate negative impact; Strong negative impact; I don't know]

[Open text]

1.4 Are you taking embodied emissions into account when making purchasing decisions?

[Always; Often; Sometimes; Rarely; Never; Don't know]

1.5 If response to Question 1.4 was not 'Never' or 'Don't know' and you have accounted for embodied emissions at least sometimes, which of the products or product groups you buy does this apply to?

[Open text]

1.6 If response to Question 1.4 was not 'Always' or 'Don't know' which factors prevent you from taking embodied emissions into account when making purchasing decisions?

[Open text]

1.7 Do you agree or disagree that you have sufficient access to embodied emissions data to support your decision-making? Please explain your reasoning, including examples of existing sources for this data and additional data which you would find valuable.

[Yes, Strongly agree; Yes, Agree; Maybe/Undecided; No, Disagree; No, Strongly disagree]

[Open text]

1.8 Would you consider paying more for products with a lower embodied carbon content? Please explain your reasoning.

[Definitely yes; Probably yes; Unsure; Probably not; Definitely not]

[Open text]

1.9 If you answered yes to question 1.8, on average, how much extra would you be willing to spend?

[0-5% more; 6-10% more; 11-15% more; 16-20% more; 21-25% more; More than 25%; I don't know]

1.10 How likely are you to increase the proportion of low carbon products in your purchases in the future? Please explain your reasoning including what factors would support the increased proportion of low carbon products you purchase.

[Very likely; Likely; Unsure; Unlikely; Very unlikely]

[Open text]

1.11 To what extent would a future of increased consumer demand for low carbon products would have the below impacts? Please explain your reasoning.

Impact 1: help you scale up your production
Impact 2: help you reduce your embodied emissions across the value chain
Impact 3: affect your business model

[Very likely; Likely; Unsure; Unlikely; Very unlikely]

[Open text]

1.12 To what extent would improved information on the embodied emissions throughout the value chain help you achieve your decarbonisation goals, and implement any of the below measures and/or technologies? Please explain your reasoning.

Option 1: Fuel switching measures (i.e. electrification, hydrogen or biomass)
Option 2: Energy efficiency measures
Option 3: Resource efficiency measures
Option 4: Carbon capture (usage) and storage
Option 5: Supply chain maximisation
Option 6: Contractual arrangements with more sustainable suppliers
Option 7: Cost savings
Option 8: Other (please specify)

For each option - [Very much; A lot; Unsure; A little; Not at all]

[Open text]

1.13 Do you have existing relationships with lower carbon steel/cement/concrete producers? If so, please provide details.

[Yes/No]

[Open text]

Chapter 2: The Embodied Emissions Reporting Framework: overview and cross-cutting considerations

The embodied emissions reporting framework (EERF) is a core component of the government's low carbon product market policies. It aims to help producers with measuring, reporting, and verifying the embodied emissions of industrial products, thereby establishing a foundation to remove information failures and support buyers to make informed purchasing decisions.

Responses from the previous consultation indicated support for the government to introduce a new framework to enable the reporting and collection of product level emissions. Respondents cited its potential to drive decarbonisation through enabling better product level reporting and consistent data. As explained in the previous consultation, key principles for the EERF are to:

- Maximise the use of existing data
- Ensure sufficient accuracy to inform policy
- Minimise administrative burdens
- Align with global standards, where possible

This chapter seeks views on the purpose of the EERF, including which features would most benefit the producers and buyers of steel, cement, and concrete. It proposes guidance on embodied emissions reporting as the first phase of the EERF, while also developing an IT system to simplify and reduce the costs of reporting, ensuring the embodied emissions data is more accessible and easier to compare. These measures are initially proposed on a voluntary basis, but the government is seeking feedback on the potential to transition to a mandatory approach in the future, subject to further consultation.

This chapter also explores whether EERF guidance should focus on best practice(s), set minimum standards, or combine both, balancing prescriptiveness and permissiveness. It proposes using life cycle assessment-based reporting as the initial approach and explores how to make the best use of existing data, including UK or EU Emissions Trading Scheme (ETS) data.

Chapters 3 and 4 also explore key considerations for the EERF. Chapter 3 looks at detailed carbon accounting methods and issues relating to Environmental Product Declarations (EPDs). Chapter 4 then discusses options for an IT system to underpin and improve reporting.

Definitions

Environmental Product Declarations (EPDs): Independently verified reports that communicate information from a life cycle analysis of a product, i.e. what a product is made of and how it impacts the environment across its entire life cycle.

Product Carbon Footprints (PCFs): Refers to the CO2 (and sometimes other GHG emissions) associated with a product. They can be generated according to a variety of measurement standards and not necessarily independently verified.

What will the EERF consist of and who is it for?

Reliable emissions data is essential for reducing emissions.[35] Measuring, reporting and verifying the embodied emissions of products helps producers demonstrate their products' green credentials to meet customer expectations and identify cost effective ways to cut emissions.

However, producers are still struggling to find decarbonisation routes due to limited information, and buyers lack access to reliable and comparable information to make informed purchasing decisions.

The previous government response did not specify what the EERF would include. Further research and stakeholder input have identified key features to support a market for low carbon industrial products and address market failures. These features are:

- Guidance on carbon accounting for embodied emissions
- A database for recording or displaying product level reporting
- Tools for monitoring, reporting and verifying embodied emissions data to aid decision making
- Access to free and consistently applied 'secondary data'[36]

The long-term aim of the EERF is to improve the production of, and access to, consistent, robust embodied emissions data in line with relevant standards. The EERF IT system could make this data publicly accessible, enabling more accurate product comparisons.

The government intends to encourage reporting of embodied emissions for industrial products by utilising existing frameworks, such as EPDs, rather than creating a new one to avoid unnecessary costs and duplication. This builds on previous consultation aims to streamline carbon reporting processes, ensuring more consistent, transparent, and accurate product level reporting.

[35] The CCC's 2022 Progress Report to Parliament recommended that government 'review, invest in…more holistic measurement on a product or whole lifecycle carbon basis.'

[36] Refers to data not produced by the producer of the product. Secondary data can be used by producers who lack complete knowledge of their supply chain to better understand emissions across the supply chain.

Intended end users

The initial intended users of the EERF are those who can significantly contribute to decarbonising industry:

- **Producers of in-scope products sold on the UK market**: Could use proposed guidance and the IT system to report embodied emissions, demonstrate their products' emissions intensity to buyers, and gain insights into their greenhouse gas (GHG) impact across the value chain. The EERF could also allow producers to compare their products' emissions intensity with competitors. The different needs of domestic and international producers will be considered
- **Buyers of in-scope products, including public and private sector procurers**: Could use embodied emissions data reported under standardised methods outlined in the guidance to make better informed purchasing decisions

Carbon accounting practitioners, such as consultants hired by producers to conduct their emissions reporting, are also key users and are grouped under 'producers' in this context. Other potential users include the public, government, and academia, who may use the EERF for information on emissions monitoring and reporting.

2.1 Do you agree or disagree that producers and buyers of in-scope products are the main intended end users of the EERF? Are there any additional end users that should be considered? Please explain your reasoning.

[Yes, Strongly agree; Yes, Agree; Maybe/Undecided; No, Disagree; No, Strongly disagree; Don't Know]

[Open text]

Intended uses and benefits

Producers currently use various complex methodologies to calculate the embodied emissions of their products, making it hard to compare emissions intensity across competitors and reliably present this data to buyers. Choosing between methodologies and interpreting areas of flexibility or ambiguity further increases the complexity and burden of reporting.

The government plans to address this issue by providing clear guidance to simplify reporting for producers and buyers. In parallel, engagement with international partners and standard setting bodies could promote greater harmonisation of methodologies in the future.

2.2 What do you consider are the benefits of measuring and reporting embodied emissions?

[Open text]

2.3 Do you believe that there are barriers to measuring and reporting embodied emissions?

[Open text]

2.4 If you are a producer or practitioner, do you currently measure embodied emissions? If so, please provide details of the processes, methodologies and standards that you follow, as well as any secondary data that you may use.

[Always; Often; Sometimes; Rarely; Never; Unsure]

[Open text]

The government's research and previous stakeholder engagement indicates the cost of measuring and verifying embodied emissions in products varies depending on several factors including which reporting framework or methodology the reporting is in accordance with, how often the measurement and verification is repeated, the number and complexity of the product(s), and its integration into project level measurement.

Costs can also relate to producers' internal resource allocation of employees. This would most likely be undertaken by a small team, who would likely have other responsibilities. Where companies are required to collect data for EU and UK under the Carbon Border Adjustment Mechanism (CBAM) and ETS, the same team is often used to support EPD production.

The government is interested in better understanding the costs of producing an EPD per product. A study from 2017 found the total cost for creating a PCR and an EPD, was in the range USD 13,000–41,000 (approximately GBP 9,700-30,700)[37].[38]

There are both fixed and variable costs associated with uploads to EPD libraries, which vary by programme operator. However, for large numbers of EPDs produced within a single project report, costs per EPD are significantly lower because many initial setup costs, such as the life cycle analysis (LCA) model, can be shared across multiple EPDs. Small and Medium-sized Enterprises (SMEs) can also benefit from discounts and there are trade associations that produce sector-wide EPDs which are used by the members. EPDs usually remain valid for five years, meaning these costs will be incurred per product every five years.

2.5 If you currently measure embodied emissions, what are the costs of this activity? Please provide context.

[Open text]

[37] Approximate values calculated 20/05/2025.

[38] National Institute for Environmental Studies, 2017, Volume 61, Pages 727-731, International Survey of the Costs of Assessment for Environmental Product Declarations

Taking a voluntary or mandatory approach

In the previous government response, the government committed to further policy development before deciding whether compliance with the EERF should be voluntary or mandatory.[39]

- A voluntary framework would allow producers to choose whether to report emissions using the guidance, and buyers could decide if they want to use EERF data for purchasing decisions.
- A mandatory framework, on the other hand, would require producers of in scope products to report emissions according to EERF specifications. Certain buyers, such as the UK Government, could also be required to purchase products with emissions reported in accordance with the EERF (see Chapter 6 on procurement).

A voluntary approach

There is a trade-off between enabling greater comparability of emissions data and minimising burdens on producers. A voluntary framework would allow producers without the administrative capacity (such as SMEs) or economic incentive to participate to opt out. Furthermore, as this policy would be the first of its kind in the UK, a 'test and learn' approach to gather evidence and refine the EERF over time could be beneficial.

However, a voluntary approach may drive less decarbonisation, as it would likely mainly capture data from lower carbon producers who wish to engage with the framework. This approach could be less effective in addressing carbon intensive products.

A mandatory approach

A mandatory approach could provide more data and information for buyers, producers, and the government, enabling better product comparison across the UK market to encourage demand. However, the government is not currently able to endorse any specific approach that would achieve this level of comparability. Existing carbon accounting standards for steel, cement, and concrete lack consistency, due to gaps in standards and inconsistencies across different accounting frameworks. Many international initiatives, including the Industrial Deep Decarbonisation Initiative (IDDI), the Organisation for Economic Co-operation and Development (OECD) and the International Energy Agency (IEA), are aiming to improve consistency.[40]

Given these challenges, the increased burden on producers, and the unclear benefits justifying these efforts at this stage, the government does not currently see a mandatory approach as viable. Additionally, exporters to the UK will be required to report their embodied emissions under the UK's CBAM from 2027. To avoid double reporting, the government believes a mandatory EERF should only be explored once further work has been done on the interoperability between the CBAM and EERF. Efforts are ongoing across the government to align these frameworks.

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[39] 2023 Carbon Leakage Government Response p.85

[40] IDDI, 2023, Driving consistency in the greenhouse gas accounting system: A pathway to harmonized standards for steel, cement, and concrete

A long-term option: An initial voluntary approach with a transition to mandatory

To balance the advantages and disadvantages of adopting either a voluntary or mandatory approach, the government is considering initially introducing the EERF on a voluntary basis and then assessing whether a mandatory approach could be adopted in the future. This phased approach aims to encourage the immediate reporting of embodied emissions data and improve product comparisons, while minimising risks such as potential unintended consequences and costs to taxpayers and producers.

With this phased approach, producers able to meet reporting requirements could provide embodied emissions data as soon as available, while others would have time to prepare for the possibility of mandatory reporting in the future. Over time, burdens on producers could be eased through tools designed to simplify reporting, as outlined in Chapter 4. The phased approach could also include staged introduction of mandatory policies and exploration of a 'comply or explain' approach. This means producers would be required to declare whether they had complied with EERF reporting measures or explain why they were not able to comply in part or in full. This could be a stepping stone towards fully mandatory requirements.

Before deciding whether to transition to a mandatory EERF, the government would consult stakeholders again, evaluating benefits and impacts on end users (such as on domestic and international producers, including those reliant on foreign imports) and taking the evolving international reporting landscape into consideration. Evidence gathered from this consultation will not be sufficient for the government to implement a mandatory approach.

2.6 Do you agree or disagree with the government's proposal to initially introduce the EERF on a voluntary basis? Please explain your reasoning.

[Yes, Strongly agree; Yes, Agree; Maybe/Undecided; No, Disagree; No, Strongly disagree; Don't Know]

[Open text]

2.7 Do you agree or disagree that a potential transition to a mandatory approach to reporting embodied emissions of products in the longer-term could be beneficial? Please explain your reasoning and whether you see any risks or opportunities.

[Yes, Strongly agree; Yes, Agree; Maybe/Undecided; No, Disagree; No, Strongly disagree; Don't Know]

[Open text]

A prescriptive or permissive approach to guidance

An overarching approach for the EERF guidance needs to be determined to help the intended users of the guidance understand its purpose and to guide decisions on the more detailed issues discussed in Chapter 3.

A prescriptive approach to EERF guidance could standardise reporting by asking producers to use a single methodology and standard, ensuring greater consistency and comparability. However, this would likely impose additional costs and burdens on those using different methodologies. Conversely, a permissive approach could offer flexibility by allowing multiple viable methodologies and standards, making it more inclusive but less comparable.

This highlights a trade-off that will be required between the assessment criteria outlined in Chapter 1: enabling product comparison (criterion 2) and minimising the burden on producers by allowing flexibility (criterion 5).

This decision is separate to how existing standards or methodologies are viewed. Chapter 3 provides further detail on these standards, where responses will be considered together with this section when shaping the guidance.

Guidance approaches

Best practice: Outlines ideal reporting method(s) for producers to showcase the emissions intensity of their products using the government's preferred methodology and standard.

Minimum requirement: Outlines minimum requirements for producers to follow when calculating and showcasing emissions data for their products.

Prescriptive approach: A single methodology and standard (or more for sector specific Product Category Rules) for carbon accounting to maximise comparability.

Permissive approach: Multiple methodologies and standards allowed for different producers to maximise flexibility.

Methodology and standard agnostic approach: General guidance that recommends the calculation of embodied emissions without favouring any specific method or standard.

The options for EERF guidance vary in focus and approach, ranging from strict standardisation to maximum flexibility:

- **Option 1: Prescriptive minimum requirement guidance** would establish achievable standard(s) for all producers, with acceptable reporting and verification requirements. It would promote a consistent baseline across producers, enhancing some comparability. However, it may limit optimal comparison
- **Option 2: Prescriptive best practice guidance** would set ambitious standard(s) for high quality reporting and robust verification, encouraging producers to aim for higher goals and achieve greater comparability if followed. However, it would offer limited

flexibility, may not fully comparable due to current framework inconsistencies, and may not be feasible for all producers

- **Option 3: Permissive minimum requirement guidance** would include multiple achievable standards with a good level of reporting. While it could provide high flexibility for producers, it would reduce comparability due to differing reporting practices
- **Option 4: Merit order of methodologies and standards** would offer a range of methodologies and standards from minimum requirement to best practice. This would balance flexibility with long term ambition. However, it would still limit comparability because of varying standards
- **Option 5: Methodology and standard agnostic guidance** would not specify reporting standards, allowing producers to use any methodology. It would offer maximum flexibility but not improve comparability beyond the current norm

It is important to note that permissive best practice guidance is not considered a viable option due to conflicting objectives of flexibility and strict standards.

2.8 Should there be a common methodology and standard for EERF guidance and should this represent best practice or minimum requirement? Please explain your reasoning.

Option 1: Prescriptive minimum requirement guidance

Option 2: Prescriptive best practice guidance

Option 3: Permissive minimum requirement guidance

Option 4: Merit order of methodologies and standards

Option 5: Methodology and standard agnostic guidance

Option 6: Other (please specify)

[Open text]

Comparing methodological approaches: life cycle assessment (LCAs) and installation-level data

The previous consultation presented two main methodological approaches for creating product level data for the EERF: using installation-level data (such as from the UK ETS) or product LCAs. Responses were evenly split between these options, prompting the government to refine its proposal. This section summarises these original options, their rationale and the current understanding of how each option would function in practice.

More work on the options for methodologies has since revealed a third possible approach: 'spend-based' input/output environmental models to calculate product emissions.[41] This is valuable in some contexts including for organisations with limited resources for emissions measurement and/or not within scope of the UK or EU ETS. However, this option is excluded

[41] See for example: https://www.climatiq.io/blog/science-behind-spend-based-emission-factors

from this consultation due to the lack of established standards, regulatory frameworks and its broad sectoral focus, which limits like-for-like comparisons.

Research and stakeholder input since the previous consultation have led to a reframed decision on the choice of methodology. The government believes that these two approaches, using installation-level data and LCAs, are not mutually exclusive and they can utilise the same data sources and methodological elements. Both approaches could be integrated into the EERF, offering robust solutions for calculating product level embodied emissions.

Consequently, the key question at this stage is whether the EERF should use installation-level data or the LCA methodology as the starting point for product level reporting. Both require further development and/or refinement of monitoring, reporting and verification (MRV) systems to ensure accurate, comparable embodied emissions data while minimising administrative burdens on industry.

Option 1: Attributing installation level data to products

This approach uses the 'installation'[42] as the unit for recording GHG emissions as defined within the UK and EU ETS.[43] It could include, for example, a steel plant or cement factory.

This approach would allow producers to utilise installation-level data they already collect for UK or EU ETS reporting, which would likely minimise additional reporting burdens for producers already reporting under these systems or to upcoming UK or EU CBAMs. Respondents from the previous consultation who favoured this approach appreciated its relative simplicity.

One significant advantage of initially using the data that producers collect for UK or EU ETS reporting as a starting point is the robust and well-established verification processes underpinning these systems. Verification includes site visits and requires accredited verifiers, ensuring credibility. Furthermore, the current uniformity of the verification process between the UK and EU ETS aids comparability across these jurisdictions, although this may diverge as a result of the ongoing ETS review.

However, additional monitoring, reporting and verification measures would be necessary to adapt installation-level ETS data for use at the product level. To obtain a holistic understanding of a product's embodied emissions and maximise the EERF's potential to incentivise decarbonisation, the reporting scope for the EERF would also need to expand beyond emissions from a single installation. For instance, it would require capturing upstream scope 3 emissions[44] and integrating supplementary emissions data from other installations and transportation stages along the product's value chain.

Existing methodologies for adapting installation-level data include under the EU CBAM, which offers a method for attributing installation-level data to products. The Low Emission Steel

[42] For the UK ETS, steel refers to pig iron or steel production exceeding 2.5 tonnes per hour, and cement refers to clinker production over 500 tonnes per day in rotary kilns or 50 tonnes per day in other furnaces. Concrete producers are excluded: https://www.legislation.gov.uk/uksi/2020/1265/schedule/2/made

[43] Ibid https://www.legislation.gov.uk/uksi/2020/1265/schedule/2/made

[44] For instance, relating to transport and manufacturing processes further up in the supply chain.

Standard (LESS) has also developed a model that enables producers to use EU ETS data for scope 1 emissions, which is discussed in more detail below and in Chapter 5.[45]

Developing monitoring, reporting and verification measures to attribute installation-level data to products for the EERF could risk duplicating efforts already undertaken for the CBAMs and LESS. Once these methodologies are finalised and operational, further policy work could focus on whether these approaches could be incorporated into the EERF. For instance, guidance could outline how additional emissions scopes could be used to supplement CBAM data to meet EERF standards.

Option 2: Product life cycle assessments (LCAs)

This approach evaluates the GHG emissions throughout a product's entire life cycle, including manufacture, use, and disposal. EPDs are an independently verified label that reports detailed information about a product and how it impacts the environment across its entire life cycle using the LCA data. LCAs use a modular structure, separating environmental impacts[46] into modules A-D, which cover the product's life cycle from raw material supply to recycling (see figure 2). Chapter 3 discusses whether the EERF should recommend using modules A1-A3 or additional modules.

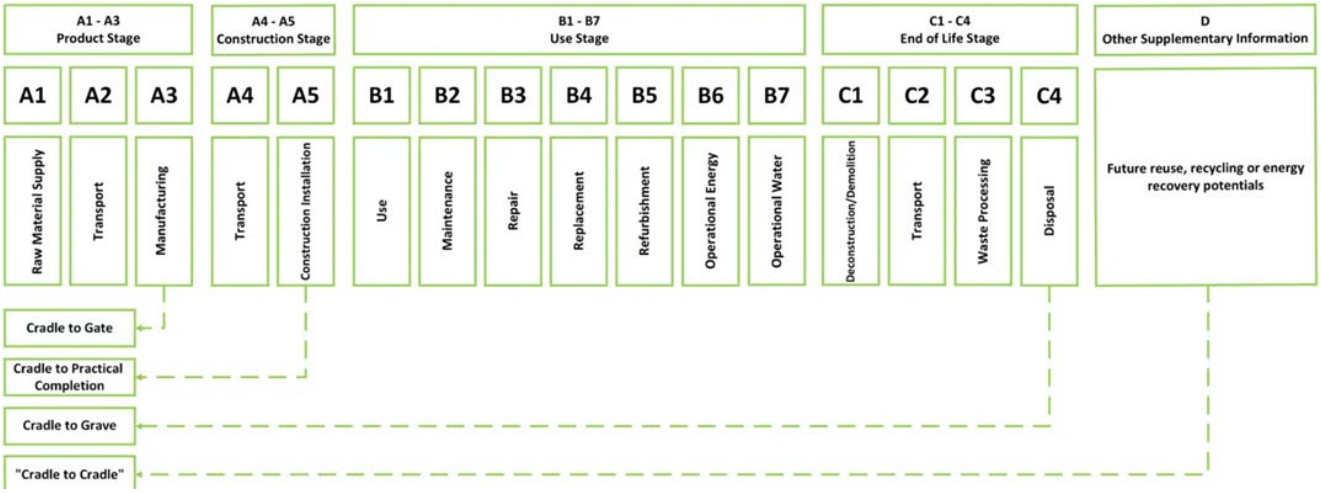

Figure 2: LCA modules in a construction context[47]
Source: Circular Ecology, EN15804 Modules Explained

Supporters of this approach in the previous consultation highlighted that it would provide more accurate and reliable data and align better with existing reporting practices in certain sectors. LCAs are already widely used in the construction and infrastructure sector, with over 130,000 EPDs for construction products available globally as of early 2023.[48] This widespread usage could minimise additional burdens on producers and buyers who already use LCAs. However, it may be costly for producers who are yet to implement this approach.

[45] The LESS model does not cover additional emissions from downstream processes for the finished product. It also asks producers to provide some upstream scope 3 information and an EPD or Product Carbon Footprint.

[46] Not necessarily limited to Global Warming Potential and Co2e (as consulted on in chapter 1)

[47] Circular Ecology, EN15804 Modules Explained

[48] ConstructionLCA, 2024, ConstructionLCA's 2024 Guide to Environmental Product Declarations (EPD)

Additionally, as LCAs are well established, this approach has a tried and tested MRV system for products using type III EPDs (see Chapter 3). LCAs may also be more accommodating for products with global supply chains, as they can be used in jurisdictions without carbon pricing systems like an ETS and for domestic producers not in scope of the UK ETS.

Since the previous consultation, further research and industry input revealed that producers often combine UK or EU ETS data with additional information to undertake LCAs and produce EPDs or Product Carbon Footprints (PCFs) for buyers, especially for products manufactured across multiple installations. Unlike EPDs, PCFs only report GHG emissions and are not always independently verified. This means using the LCA approach initially for the EERF could potentially maximise the use of existing data, although additional guidance may be needed.

The main disadvantage of the LCA approach is the flexibility allowed by current standards, which leads to inconsistencies in methodology application. This impedes comparability and increases the burden on those reporting against these standards to decide how to apply them. Chapter 3 explores some of these considerations.

Initial recommendation

The government's initial recommendation for the EERF is to deliver guidance focussing on LCA-based reporting. This would help simplify the reporting process for producers. The government will not seek to develop a new methodology to derive product level emissions data from ETS data at this time. This could be duplicative of work already undertaken for the EU CBAM and LESS.

As such, the next phase of work will focus on improving consistency and comparability in LCA-based reporting. This will include exploring ways to maximise the use of existing data, such as the UK and EU ETS data, and pursuing interoperability between different product level emissions reporting approaches. This is discussed further in Chapter 3.

In the short term, the government will encourage more producers to produce EPDs or PCFs, as consulted on in Chapter 3. Greater uptake of a singular methodological approach will drive consistency and is more likely to have a greater impact on improving the quality and quantity of data needed to support low carbon market policies.

2.9 Do you agree or disagree that the initial EERF guidance should focus on life cycle assessment (LCA) based approaches to reporting? Please explain your reasoning.

[Yes, Strongly agree; Yes, Agree; Maybe/Undecided; No, Disagree; No, Strongly disagree; Don't know]

[Open text]

Streamlining and utilising existing data

In the UK, businesses face various disclosure requirements for emissions and energy use, including the Energy Saving Opportunity Scheme (ESOS), Streamlined Energy and Carbon Reporting (SECR), Climate Change Agreements (CCA), and Carbon Reduction Plans (CRP). These reporting frameworks differ in their requirements, scope, levels of operation, and contexts, which determine the type of data required, such as the relevant emissions scopes or carbon accounting methodologies.

In the 2021 Call for Evidence,[49] respondents agreed with the government's assessment that current climate-related reporting is insufficient to support the development of product level policies. Consequently, the government will continue to develop EERF proposals and aim to reduce reporting burdens while promoting interoperability, where possible.

EERF policy development will progress alongside broader efforts to review business level energy and emissions reporting requirements. The goal is to design and deliver a standardised, low burden reporting regime that improves energy efficiency and emissions reductions across businesses and industry. Considering opportunities to streamline existing and future reporting applies both to domestic frameworks, such as the EERF and the schemes listed above, and internationally focussed policies like the UK CBAM. Additionally, the government is also engaged in efforts to streamline reporting and enhance interoperability at relevant international fora.

2.10 Is there anything else that the government should consider regarding maximising use of existing data?

[Open text]

[49] HMG, 2021 Towards a market for low emissions industrial products: call for evidence - GOV.UK

Chapter 3: Guidance in the Embodied Emissions Reporting Framework (EERF)

As discussed in the previous chapters, the government plans to publish guidance on measuring the embodied emissions of steel, cement, and concrete products as the first element of the EERF. As outlined in Chapter 2, the guidance will utilise the Life Cycle Assessment (LCA) method and an Environmental Product Declaration (EPD) or Product Carbon Footprint (PCF) format to measure and report emissions.

This chapter outlines the rationale for utilising existing internationally recognised standards instead of developing new ones. It seeks views on which PCF or EPD standard(s) the government could endorse and recommendations for verifying embodied emissions. It also invites views on key considerations for the EERF guidance, including:

- Defining the embodied emissions reporting framework (EERF) reporting metric(s)
- Identifying relevant life cycle stages
- Recommended standards for measuring embodied emissions
- Verification of embodied emissions data

The government is also seeking views on methodologies to standardise data use and cross-sectoral approaches for EPDs. These efforts would aim to reduce variation, improve accuracy, and enhance confidence in the results. To enable methodological consistency four additional technical considerations are consulted on in this chapter:

- Secondary data, emissions factors and default values
- Emissions allocation of co-products
- Accounting for alternative fuels
- Ensuring data quality

These measures intend to improve the comparability of product level embodied emissions while maintaining high data quality.

The government intends to use insights from this consultation as well as undertake additional stakeholder engagement to shape and finalise the guidance. Once complete, the guidance is expected to apply to finished products and consumer-facing EPDs and PCFs, which are required for many of the product classifications discussed in Chapter 5.

Benefits for producers

Simplifying and clarifying measurement approaches through guidance would help address the challenges posed by multiple competing or unaligned methods for calculating product emissions. Such inconsistency can create uncertainty and increase costs for businesses

adjusting between different approaches.[50] According to an Organisation for Economic Co-operation and Development (OECD) report: “comparability issues can lead to allocative inefficiencies. For instance, more carbon-efficient products may fail to secure a green premium in the market because less carbon-efficient products obtain similar carbon intensity "scores” by choosing a more favourable accounting metric.”[51] Establishing a consistent methodology could benefit producers of low carbon products and LCA practitioners they hire to produce EPDs or PCFs.

The recommendations in this guidance could inform the basis of a potential future mandatory reporting framework, as discussed in previous chapters, subject to further consultation. The EERF guidance could help producers prepare for potential future reporting requirements while offering an opportunity to provide early feedback on those requirements. The government remains committed to a gradual and consultative approach in developing any future mandatory requirements for the EERF.

Benefits for buyers

Guidance will precede longer term buyer focused policies like ecolabelling, as discussed in Chapter 7. In the shorter term, guidance could support buyers by highlighting key methodological decisions that should be considered when evaluating product emissions data in EPDs. Buyers sometimes lack understanding of how considerations such as the emissions allocation of co-products or whether alternative fuels are reported on a gross or net basis affect a product’s carbon footprint. Clearer information could help buyers make better comparisons. Product level embodied emissions data, presented through EPDs or PCFs could be incorporated into public procurement processes.[52] This is explored in Chapter 6.

Key considerations for guidance

This section sets out key considerations to develop the EERF guidance and framework, including how to define reporting metrics, identify relevant life cycle stages for measurement, and recommend which standards to use for measuring embodied emissions.

Defining reporting metric(s)

Reporting metrics are a crucial consideration for EERF guidance. They provide a consistent framework for specifying required information to measure and report and enable producers and buyers to better understand a product’s embodied GHG emissions. These metrics depend on the environmental impacts considered in manufacturing (see Chapter 1), such as carbon dioxide (CO2), methane or global warming potential, which are measured against the product.

In the previous consultation, most respondents supported using ‘CO2e/mass (with a performance metric where relevant)’ as the reporting metric for embodied emissions and as the

[50] For example High Value Manufacturing Catapult, 2022, page.8: Embodied Emissions and Net Zero A Review of Standards and Recommendations for Consistent Greenhouse Gas Emissions Accounting in the UK , High Value Manufacturing Catapult

[51] OECD, November 2024, page 54, 'Towards more accurate, timely, and granular product level carbon intensity metrics: challenges and potential solutions'

[52] In accordance with a specified methodology(s)

basis for future policies.[53] The majority also agreed that 'mass (of product)' is the appropriate unit for measurement in their sector'. However, some respondents preferred a sector specific approach, while others proposed functional units (as compared to 'declared units' defined below) or the inclusion of additional environmental impacts.

Declared and functional units

Declared unit: This metric measures CO2e or GWP per quantity, typically by mass or volume (e.g. 'CO2e per kg of steel' or 'CO2e per m3 of cement'). It is commonly used when a product's end use is unknown.

Functional unit: This metric quantifies emissions based on the product's performance in its end use, including its expected lifespan (e.g. 'x amount of CO2e in a 1-tonne steel beam, S grade designed to last for 80 years in a building' or 'x amount of CO2e in 1 m3 of concrete with a strength class of C20/80 to be used for 60 years in a building' are functional units).

Based on this feedback, the government is consulting on three refined options for the reporting metric:

- Option 1: Declared unit regardless of whether the final use of the product is known by the producer. In this option a declared unit would be recommended in all circumstances
- Option 2: Functional unit where possible if the function of the product is known to the producer and the use of a declared unit where that is not feasible
- Option 3: The producer should choose whether they report a declared or functional unit depending on what they consider most appropriate to their context

3.1 Which option for the reporting metric do you think the guidance should recommend? Please explain your reasoning, and details of any alternative options.

Option 1: Declared unit, regardless of whether the final use of the product is known by the producer

Option 2: Functional unit, where possible if the function of the product is known to the producer and the use of a declared unit where that is not feasible

Option 3: The producer should record the metric they consider most appropriate

Option 4: Other (please specify)

[Open text]

[53] UK Government, Carbon Leakage Consultation, 2023, Question 7.3

Identifying relevant life cycle stages

Beyond the embodied emissions from production, products also have environmental impacts during their use and at the end of their life. These include operational energy use, disposal, and recycling or reuse potential.[54]

Accounting for these impacts can provide buyers with a more comprehensive understanding of a product's overall embodied emissions. However, producers often have limited knowledge about how their products are used, disposed of, or recycled. While, in theory, some producers could measure and report emissions across their supply chain, including use and disposal stages, this can be challenging and time consuming. Therefore, the government does not intend to recommend reporting on GHG emissions beyond what producers can reasonably know, given their limited insight into the use and disposal of their products.

The different stages of a product's life cycle can be divided into stages or modules (as illustrated in the comparing methodological approaches section of Chapter 2). For example, EN 15804[55] (widely used in the construction sector) uses a product life cycle module categorisation but producers and buyers may be familiar with other categorisations such as 'direct' and 'indirect' emissions or 'scopes' 1 to 3. This section is intended to consult on the underlying policy issue of which relevant life cycle stages the EERF guidance should recommend reporting on as opposed to asking for views on the merits of any particular standard. EN 15804 is described below as an example to inform discussion of these policy issues. And question 9 also follows the format at that standard.

For EN 15804, reporting is generally in accordance with two scenarios:[56]

Scenario 1: if the producer *does not know* how the product will be used and disposed of:								
A1: raw material supply			A2: transport			A3: manufacture		
Scenario 2: if the producer *does know* the how product will be used and disposed of:								
A1-A3 *plus*	A4: construction process transport	A5: construction process installation	B4: replacement	C1: deconstruction	C2: transport	C3: waste processing	C4: disposal	D: Reuse, Recover, and Recycling

Table 1: Reporting scenarios for different stages of a products life cycle

The government believes that these two scenarios balance the needs of buyers and wider sustainability benefits, while not over-burdening producers. Accordingly, after consultation with stakeholders, the government's proposal is that reporting in the EERF should be in accordance with EN 15804.

An alternative option is that in the proposed guidance the government should specify A1 to A3 as a minimum requirement. The advantage of measuring and recording these modules is that it

[54] Also referred to as 'downstream scope 3' impacts in the Greenhouse Gas Protocol terminology.

[55] BS EN 15804+A2019 (abbreviated as EN 15804): "5.2 Types of EPD with respect to life cycle stages covered". In particular, "Any omission of modules C1–C4 and module D shall be justified."

[56] To a certain extent the particular modules reported can depend on different EPD standards and practice.

would give greater flexibility to producers to measure and report any other modules at their discretion. This would be in accordance with the unique situations of each producer.

3.2 Which part of the product's life cycle should the EERF guidance recommend reporting on? Please explain your reasoning.

Option 1: Aligned with EN 15804 (as per the scenarios above)

Option 2: A1-A3 as a minimum requirement and any reporting of other modules at the producer's discretion

Option 3: Other (please specify)

[Open text]

Recommending standards for measuring embodied emissions

The previous consultation revealed a preference by respondents for adopting internationally recognised standards rather than creating new ones.[57] Respondents were consulted on what type of life cycle methodology framework should be adopted, to which over half responded that alignment with internationally recognised standards that are also used in the UK would be preferable. Respondents noted a range of benefits for this approach including lower administrative burden and international alignment with trading partners.[58]

Standards from established bodies such as British Standards (BS), European Standards (EN), and the International Organization for Standardization (ISO) provide clear requirements for producers and inspire confidence in buyers by leveraging the expertise of established standard setting and verification communities. Adopting these existing standards could avoid duplication of effort. Following this feedback, the government is not proposing to develop new standards for the EERF. It should be noted that although standards are produced by subject matter experts and are intended to be publicly accessible and widely used, some have costs to access, summarised below in Table 2.

The EERF guidance will aim to balance flexibility for producers (allowing them to follow standards that minimise costs) with the need for standardisation to provide buyers with consistently comparable data for informed decisions. The guidance could range from minimum requirements, which align with broader general standards and allow self-verification, to best practices, which require independent verification and focus on EPDs with the appropriate Product Category Rules (PCRs). Best practice could improve product comparability and enable tracking of broader environmental impacts.

Since standards and PCRs are often sector specific, this section of the consultation is organised by sector. However, the government aims to establish a co-ordinated reporting approach across all sectors. The relationship between general standards, sector specific PCRs, and other standards is explained in Part 2 of the technical annex.

[57] UK Government, Carbon Leakage Consultation, 2023, Question 7.2

[58] Ibid.

Respondents are encouraged to provide feedback on the proposed standards below and suggest additional standards they think may be suitable for embodied emissions measurement. For instance, standards integrated with product classifications, as discussed in Chapter 5, could also provide guidance on emissions reporting.

Respondents are also asked to consider the assessment criteria, particularly the criteria *'*enables product comparison' (criterion 2), 'ensures measurement is robust and comprehensive*'* (criterion 3), and 'minimises costs' (criterion 5).

The existing standards that have been identified for potential inclusion in the EERF guidance are based on stakeholder feedback and alignment with the sector scope outlined in Chapter 1. A summary of these standards is provided in the table below:

Selected features of standards						
Standard		**Cost to obtain** [59]	**Scope of product life cycle**	**Verification policy**	**Emission categorisa-tion**	**Allocation of co-products policy**
General Product Standards **(**aligning more with minimum requirements)	ISO 14067 Greenhouse gases; Carbon footprint of products; Requirements and guidelines for quantification	£157	Unspecified [60]	Self-verification allowed	LCA stages (i.e. more general than modules: 'manufacture', 'use', & 'disposal')	Hierarchy with preference for physical partitioning.[61]
	Greenhouse Gas Protocol for Products Product Life Cycle Accounting and Reporting Standard	Free	Cradle-to-gate is a "partial life cycle inventory" and must be specified and defined.[62]	Self-verification allowed.[63]	LCA stages (i.e. more general than modules: 'manufacture', 'use', & 'disposal')	Hierarchy with all methods allowed.[64]
	Publicly Available Specification[65] for the assessment of the life cycle greenhouse gas emissions of goods and services 2050.	£178	Unspecified and defers to ISO 14025 or the PCR if one exists.[66]	Self-verification allowed[67]	LCA stages (i.e. more general than modules: 'manufacture', 'use', & 'disposal')	Economic allocation[68]
EPD standards with relevant PCRs (aligning more with best practice)	ISO 14025 Environmental labels and declarations; Type III environmental declarations; Principles and procedures (general EPD standard)	£116	Exclusions of declaring the full life cycle to be stated and justified.[69]	Independent verification	LCA modules (e.g. A1, A2, A3)	Unspecified
	Core EPD PCR in Europe for construction. BS EN 15804+A2[70] Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products with complementary/sub-PCRs below.					
	BS EN 17662. Steel, Iron and Aluminium structural products for use	To be confirmed when published	Product dependent [71]	Independently verified	LCA modules	Economic allocation[72]

	in construction works (draft)	21/08/2025				
	BS EN 16757:2022, Concrete and concrete elements	£430	Cradle to grave and module D recommend-ed.[73]	Independently verified	LCA modules	Economic allocation[74]
	BS EN 16908:2022. Cement and building lime	£220	A1-A3 (cradle to gate) required, others optional.[75]	Independently verified	LCA modules	Hierarchy with economic allocation permitted.[76]
Sector specific standards	ISO 20915 Life cycle inventory calculation methodology for steel products	£136	Cradle to the gate of the steel works (excluding finished steel products)[77]	Unspecified	Steel industry specific with comparison to LCA modules table.[78]	System expansion allowed.[79]

Table 2: Selected features of key product level emissions measurement standards

[59] Cost to obtain standard; from ISO website converted to £ at the time of drafting.

[60] BS EN ISO 14067:2018 clause 6.3.1

[61] BS EN ISO 14067:2018 clause 6.4.6.2

[62] Greenhouse Gas Protocol, 2011, Greenhouse Gas Protocol for Products Product Life Cycle Accounting and Reporting Standard, chapter 7 requirements, page 37.

[63] Ibid, chapter 12, Assurance, page 94.

[64] Ibid, chapter 9, Allocation, paragraph 9.2,

[65] A 'Publicly Available Specification' is not technically identical with a standard.

[66] Publicly Available Specification for the assessment of the life cycle greenhouse gas emissions of goods and services 2050:2008 (PAS 2050) paragraph 6.1, Establishing the System Boundary

[67] Ibid paragraph 10.3.4 Self-validation

[68] Ibid paragraph 8.1 Allocation of emissions from co-products

[69] ISO 14025:2010, Environmental labels and declarations — Type III environmental declarations — Principles and procedures, paragraph 5.3, Life cycle basis and 5.4 modularity.

[70] Note, A2 refers to the 2019 amendment.

[71] BS EN 17662 (draft), Steel, Iron and Aluminium structural products for use in construction works (draft), paragraph F.2 The life cycle stages

[72]Ibid, paragraph 6.4.3.2.1 General

[73] BS EN 16757:2022, concrete and concrete elements paragraph 6.2.1, General

[74] Ibid, paragraph 6.4.3.2, Co-product allocation

[75] BS EN 16908:2022. Cement and building lime, paragraph 6.2.1, General. Note this PCR is complementary to BS EN 16757 because it is for the input good of concrete.

[76] BS EN 16908:2022, paragraph 6.4.3.3 Co-products used in cement and building lime

[77] BS ISO 20915: 2018. Life cycle inventory calculation methodology for steel products, paragraph 4.3, System boundary.

[78] Ibid, Annex D Comparison among standards Table D.1 — Comparison table of standard.

[79]Ibid, paragraph 5.5.1 General Requirement and 5.5.2 System expansion.

Steel standards

A variety of standards are used in the steel sector, with no one standard predominating.

3.3 For steel producers, which of the options for standards should the EERF guidance endorse? Please explain your reasoning.

Option 1: A general product standard (such as ISO 14067, Greenhouse Gas Protocol for Products, or PAS 2050). (If so, please specify)

Option 2: ISO 14025 with the appropriate PCR (if so, please define the level of product standard specificity desired: for example, BS EN 15804 only)

Option 3: Industry specific standard (such as ISO 20915). (If so, please specify)

Option 4: Product classification(s) only (please specify)

Option 5: Other (please specify)

[Open text]

Cement and concrete standards

In the cement and concrete sectors, EN 15804 is widely regarded as the most used standard in Europe.[80] EN 15804 sits underneath ISO 14025 as the global EPD standard. It also serves as the foundation for the cement and concrete product classifications outlined in Chapter 5. EN 15804 is the core product category rule for EPDs in construction, applying to both cement and concrete with a complementary PCR for both of those sectors.[81]

3.4 For cement and concrete producers, which of the options for standards should the EERF guidance endorse? Please explain your reasoning.

Option 1: A general product standard (such as ISO 14067, Greenhouse Gas Protocol for Products, or PAS 2050). (If so, please specify)

Option 2: ISO 14025 with the appropriate PCR (if so, please define the level of product standard specificity desired: for example, EN 15804 only)

Option 3: Industry specific standard (If so, please specify)

Option 4: Product classification(s) only (please specify)

Option 5: Other (please specify)

[Open text]

[80] Ecomatters, 'Developing an EPD in accordance with EN15804'

[81] The relevant complementary-PCRs that apply in Europe for cement are BS EN 16908:2022. “Cement and building lime” and for concrete BS EN 16757:2022, “concrete and concrete elements”.

Verification of embodied emissions data

In the previous consultation, there was strong support for independent verification of product level embodied emissions data by an accredited regulator or body rather than self-verification. Respondents highlighted that independent verification would improve credibility and ensure data robustness, while holding greater accountability for producers. Concerns about self-verification included risks of errors or misrepresentation. As a result, the government does not consider self-verification to be an appropriate option for the EERF.

Verification of emissions data is typically tailored to the requirements of the respective framework, including data collection aims, data users, and usage implications. The primary goal of the EERF is for producers of in-scope products to report embodied emissions data, enabling buyers to access and compare product emissions accurately. Reliable verification is essential to ensure meaningful comparisons based on accurate data.

Key factors influencing the verification process include:

- **Verifier qualifications:** Ensuring verifiers are suitably qualified and aligned with agreed standards
- **Adherence to standards:** The permissiveness or prescriptiveness of standards would impact consistency
- **Cost and time:** Verification should be completed within reasonable financial and time constraints

The government intends to implement independent verification that balances these considerations. Producers would engage qualified verifiers to work within budget and time requirements, adhering to agreed standards.

To ensure a credible yet deliverable verification process, the government is assessing existing verification frameworks for suitability within the EERF. Should inefficiencies be identified, potential interventions may include:

- Providing tailored guidance
- Developing practical tools
- Collaborating with verifying organisations

Environmental Product Declaration (EPD) verification

In accordance with the initial recommendation in Chapter 2, the initial focus of the EERF is intended to be on achieving consistency and comparability in LCA-based reporting. Since EPDs are already widely used across the steel, cement and concrete sectors, an established verification process for EPDs is already in place.

EPDs must be verified by approved independent verifiers or accredited certification bodies with knowledge of the products being assessed. These verifiers ensure compliance with the

international standard ISO 14025 and must be certified under ISO 14065.[82] Verification ensures that the EPD submitted by the manufacturer references a specific PCR and complies with the standards set out in that PCR.

Currently, EPD verification does not confirm the accuracy of the data itself; it only ensures that the calculations adhere to the correct processes in line with the set standards and PCRs. Site visits are not part of the verification process, unlike with the UK ETS (an installation-level regulation), which legally requires on-site verification.

EPD verifiers are accredited by EPD programme operators, who establish qualification and experience requirements. Verification requires skilled professionals with relevant qualifications, sector specific experience and LCA knowledge, amongst other requirements. However, these stringent requirements may limit the availability of qualified verifiers, which the government understands to be a growing issue in the construction sector.[83]

The time required for EPD verification depends on the complexity of the product and the verifier's experience. Policy measures promoting EPD adoption could strain resources further, increasing verification timelines.

Verification costs vary based on factors such as the verifier, the programme operator, and the number of EPDs submitted. The cost of verifying an EPD will often be discounted if multiple EPDs are submitted at the same time.[84] A 2017 study found that the median price for EPD verification was £2,004 ($2,447).[85]

EPD verification follows a market-led approach, offering flexibility for private sector needs to signal credibility to buyers. However, this system may complicate government policy development due to inconsistencies in verification methodologies and robustness across different organisations. While a market-led approach supports some of the assessment criteria ‘operationally ready’ (criterion 4) and ‘minimises costs’ (criterion 5), its alignment with the other three assessment criteria remains uncertain and highly dependent on individual PO’s rules.

3.5 Do you think the EPD verification system is sufficiently robust?

[Yes, Strongly agree; Yes, Agree; Maybe/Undecided; No, Disagree; No, Strongly disagree]

[82] ISO 14065:2020, General principles and requirements for bodies validating and verifying environmental information.

[83] Planning, Building and Construction (PBC) today, November 2023, 'The importance of Environmental Product Declarations in sustainable construction'.

[84] EPD Ireland: 1 EPD - €1700, 5 EPDs - €2200, Programme fees - Irish Green Building Council. IBU: 1 EPD - €2000, 5 EPDs – unknown but discounted, Frequently Asked Questions | IBU - Institut Bauen und Umwelt e.V.

[85] National Institute for Environmental Studies, 2017, Volume 61, Pages 727-731, International Survey of the Costs of Assessment for Environmental Product Declarations

3.6 If you believe that there are issues with the EPD verification process, which of the below possible issues apply? Please explain your reasoning. [select all that apply]

Option 1: Robustness of verification process

Option 2: Verification time following submission of EPD

Option 3: Cost of EPD verification

Option 4: Comparability of results

Option 5: Availability of qualified verifiers

Option 6: Other (please specify)

Option 7: None of the above

[Open text]

Potential interventions for EPD verification

To strengthen robustness, comparability, and capacity within the EPD verification market, the government has identified the following potential interventions for EERF verification:

- **Option 1: Guidance integration:** Verification could be incorporated into the EERF guidance, aligning with other monitoring and reporting recommendations consulted on in Chapter 2. The government could expand existing verification guidance by providing new recommendations on best practices or endorsing programmes with strong verification processes
- **Option 2: Provision of pre-verified tools:** The government could support producers by offering pre-verified tools to create EPDs. This could simplify verification by enabling data input that adheres to agreed standards, reducing the verifier's workload and verification time. These tools already exist and range in cost from £1,500 to several thousand pounds a year, depending on product complexity, provider and features. The government is also exploring how an IT system could provide tools for embodied emissions reporting and verification (see Chapter 4)
- **Option 3: Collaboration with programme operators:** Collaboration with programme operators could align their initiatives with government priorities if issues arise. This includes working on methodologies, increasing the number of accredited verifiers, and verification processes. Further exploration would depend on stakeholder feedback on the most critical aspects of the verification process
- **Option 4: Select or establish a particular programme operator:** The government could select or establish a programme operator to align verification processes with policy objectives. This is already happening internationally. For example, the French

government's INIES[86] verification programme verifies quantitative environmental declarations, such as EPDs, for construction projects. Verification is conducted by verifiers accredited by INIES, ensuring compliance with ISO 14025, EN 15804, and relevant French decrees and programme rules

3.7 Do you believe that any of the following possible government interventions could help improve the robustness and quality of the current EPD verification process and capacity in the market? Please explain your reasoning. [select all that apply]

Option 1: Produce guidance

Option 2: Support the creation of verification tools

Option 3: Work with or accredit programme operators

Option 4: Select or establish a particular programme operator

Option 5: No intervention

Option 6: Other (please specify)

[Open text]

Enabling methodological consistency: technical considerations

Additional methodological decisions are needed to ensure the EERF guidance improves reporting consistency and comparability beyond current standards, where deemed necessary by the government. These decisions involve highly technical considerations that can impact the data outputs of embodied emissions reporting, meaning variations may affect comparability. The objective is to achieve methodological consistency, thereby improving comparability and unlocking its associated benefits.

Key methodological factors influencing the reporting process include:

- **Secondary data, emissions factors and default values:** Producers often use different 'secondary' or 'generic' databases to fill data gaps in their supply chains
- **Emissions allocation of co-products:** How emissions are allocated when co-products produced in one industrial process are used in the production of another industrial product (e.g. ground granulated blast furnace slag (GGBS) use in cement production)
- **Accounting for alternative fuels:** How emissions are accounted for when alternative fuels are used in production of an industrial product such as biogenic (produced by living organisms) or non-biogenic waste
- **Ensuring data quality:** Other data quality considerations in line with BS EN 15941 such as geographical representativeness, temporal representativeness, precision, completeness, consistency and data sources

[86] https://www.inies.fr/en/

Current variations in the reported embodied emissions of a single product are a significant challenge, as they depend on the chosen methodology and its application. Variations occur within sectors, as standards often lack standardised features like secondary databases, and between sectors. Further details are provided in the technical annex. Methodological consistency is essential in the EERF guidance to:

- **Enable product comparison across sectors**: Existing standards can lack coordination across sectors, resulting in variations in how individual product emissions are measured. This issue is particularly significant in construction, where steel, cement, and concrete often interact or can be substituted[87]
- **Help prevent double counting or omissions:** Especially when aggregate emissions across different sectors are considered
- **Incentivise decarbonisation:** Methodological consistency ensures emissions are apportioned fairly across sectors, providing buyers with accurate information and encouraging decarbonisation in industries that interact during manufacture
- **Supports future sectoral expansion:** As the sectoral scope of the EERF could be expanded in the future to include additional sectors with greater interactions, ensuring methodological consistency becomes increasingly critical. Key aspects such as Carbon Capture Use and Storage (CCUS), electricity accounting, alternative chain of custody methods (different ways emissions are divided among multiple products), and scrap metal reporting currently hinder effective comparisons

Secondary data, emissions factors, and default values

Existing embodied emissions reporting frameworks often allow ‘secondary’ or ‘generic’ data, which is often unavoidable when producers cannot access emissions data from their supply chain. Different secondary databases use varied input data, significantly affecting carbon footprint results. Despite this, existing standards do not specify which databases should be used, and producers rely on a range of options, which are often integrated into tools like EPD generators. These secondary databases can be free or licence-based, with associated costs, as explored in Chapter 4.

Life cycle inventory database

LCI databases contain information on the average environmental footprint of most materials and processes used in manufacturing goods. They are often used when creating product level LCAs, particularly when a producer requires information of which they do not have knowledge.

[87] For instance, ISO 20915 in the steel sector favours ‘system expansion,’ granting steel producers an emissions credit for using ground granulated blast furnace slag (GGBS) as a substitute for clinker in the cement sector. However, BS EN 15804, the core PCR for construction EPDs in Europe and widely used in the cement and concrete sectors, does not allow this method. Instead, these sectors’ complementary PCRs typically require or permit ‘economic allocation’.

The government understands that the World Steel Association's database and GaBi/Sphera[88] is commonly used in the steel sector, while Ecoinvent[89] is frequently used in the cement and concrete sectors. However, some overlap exists between sectors (for instance, the Low Emission Steel Standard (LESS) discussed in Chapter 5) primarily requires Ecoinvent data for upstream scope 3 emissions when primary data is unavailable.

To enhance comparability and reporting consistency, the EERF guidance could recommend that producers use a single secondary database with emission conversion factors. It could also advise buyers to compare EPD or PCF results based on the same database. This database could be a widely used public option, such as the Inventory of Carbon & Energy database,[90] or a popular licence-based choice like Ecoinvent or Sphera.

Examples of life cycle inventory databases (international and domestic)

Example 1. Sphera Managed LCA Content (formerly known as GaBi) (USA): Sphera contains EPDs and generic U.S. data. It allows access to third party databases such as Ecoinvent and the U.S. life cycle inventory (LCI) database. It is one of the largest global databases with over 17,000 datasets which cover most industrial sectors from 60 industrial associations.

Example 2. Ecoinvent: Contains a comprehensive LCI database that provides detailed, high-quality data on the environmental impacts of products and services. It is widely used for LCAs. The database contains data on a wide range of industries, covering such aspects as energy use, emissions, resource use, and waste, and activities are attributed to geographic location.

Example 3. Inventory of Carbon and Energy (ICE): Run by Circular Ecology, ICE is a resource that provides information on the embodied carbon and energy content of various materials and processes. It offers data on the environmental impact associated with the production, use and disposal of products and services. The ICE database is free and easy to access. It cannot be used for generating EPDs as it records CO2e emissions and energy use only. It is widely used for PCFs. The database is free to download.

While some databases provide secondary data for cement, concrete, and steel (which would improve comparability between them), the sectors often use different secondary databases that are applicable to their context; this can also vary within sectors. The questions that follow are therefore split by sector.

[88] Sphera's LCI database was previously referred to as GaBi but is now known as Sphera's LCA content. Because GaBi is still sometimes used and some respondents may be familiar with that term both words have been used in this consultation for context. https://sphera.com/solutions/product-stewardship/life-cycle-assessment-software-and-data/ https://sphera.com/solutions/product-stewardship/life-cycle-assessment-software-and-data/

[89] https://ecoinvent.org/

[90] https://circularecology.com/embodied-carbon-footprint-database.html

3.8 Which options should the EERF guidance recommend regarding secondary data? Please explain your reasoning.

Option 1: Secondary data from a single database

Option 2: No specific policy on secondary data other than what is specified in standards

Option 3: Other (please specify)

[Open text]

3.9 If you answered Option 1 to Question 3.8, which secondary database do you think reporting should be in accordance with for cement and concrete? Please explain your reasoning.

Option 1: ICE

Option 2: Ecoinvent

Option 3: Sphera (formerly known as GaBi)

Option 4: Other (please specify)

[Open text]

3.10 If you answered Option 1 to Question 3.8, which secondary database do you think reporting should be in accordance with for steel? Please explain your reasoning.

Option 1: ICE
Option 2: Ecoinvent
Option 3: Sphera (formerly known as GaBi)
Option 4: Other (please specify)

[Open text]

Emissions allocation of co-products

A coordinated approach to measuring and reporting is essential for steel, cement, and concrete sectors due to their interactions, such as steel co-products being used in cement and concrete production. Emissions allocation for co-products remains a key challenge in carbon accounting, particularly between the steel and cement industries. The difficulty lies in how emissions are divided between the producer and buyer of the co-product, with multiple allocation methods in use. A unified approach can ensure consistency and prevent emissions from being overlooked due to differing rules.

Co-products and allocation methods

A co-product is manufactured together with another product using some of the same materials during the same industrial process or product system. Co-products can be sold to another industry.[91] For example, steel production also produces ground granulated blast furnace slag (GGBS) as a co-product that can be sold as a substitute for clinker in cement production. There are several methods to allocate the emissions of co-products:

No allocation: All emissions are allocated to the main product of the process (i.e. all to steel, none to slag).

Economic allocation: Emissions allocated based on earned revenue from co-outputs made from same process and then sold. For example, if 1% of the steel producer's revenue came from selling the slag then 1% of the emissions from the blast furnace would be allocated to the purchaser of the slag.

Physical partitioning: Emissions allocated based on inputs/outputs of distinct processes which produce steel and slag.

System expansion: Products are assigned emissions credits equivalent to the emissions displaced in an adjacent system using co-outputs.

Mass-based allocation: Emissions allocated based on physical relationships between co-outputs (e.g., mass, energy) made from same process.

3.11 Separate to the specific rules of product classifications, do you consider that the EERF guidance should specify a particular allocation of co-products method and if so what method? Please explain your reasoning.

Option 1: No specific policy on allocation

Option 2: No allocation

Option 3: Economic allocation

Option 4: Physical partitioning

Option 5: System expansion

Option 6: Mass-based allocation

Option 7: Other (please specify)

[Open text]

Accounting for alternative fuels

In the production of industrial products, either traditional fossil fuels or alternative fuels can be used in the process. In this context 'alternative fuels' refers to those that generate emissions. These fuels are often waste products that would be sent to landfill if not used in the process.

[91] Although there is not a consistent definition of how by-products and co-products differ, by-products are generally of lower value (or no value) and volume than co-products.

An ongoing issue in the cement and concrete sectors is how to account for the emissions of alternative fuels. How the emissions of alternative fuels are accounted for and presented will impact the reported embodied emissions of a product and therefore if not consistent could impact comparability.

Waste products can be divided into biogenic and non-biogenic waste fuels; the use of these fuels is substantial in the cement industry.[92]

- Biogenic waste fuels are those made of organic matter such as wood
- Non-biogenic waste fuels are those made of inorganic matter such as crude oil. Common wastes like plastic and tyres can contain a mixture of both biogenic and non-biogenic materials

The emissions associated with burning alternative fuels are often higher than traditional fossil fuels. For example, wood has a higher emissions intensity than natural gas or coal. Yet these fuels are often recorded as having zero emissions because these products already exist and if not used as fuels would be sent to landfill. This is in accordance with the principle that the producer of a product is responsible for its emissions, therefore the emissions are attributed to the initial producer, not those using waste products as fuel.

In accordance with the assessment criteria ‘incentivising decarbonisation’ (criterion 1) and ‘ensures measurement is robust and comprehensive’ (criterion 3), transparency in product emissions is necessary, including the use of alternative fuels.

A solution to this issue is for producers to report both the ‘gross’ (total emissions from production) as well as the ‘net’ (total emissions minus the emissions from waste fuels, including non-biogenic fuels). This would enable transparency and ensure that emissions are not unaccounted for. This is common practice in EPDs in the UK and recommended by the Mineral Products Association (MPA). Note that under BS EN 15804 this is currently optional.[93]

The government’s proposal is to recommend that both net and gross should be reported in the guidance. Note that the following question relates to when decisions are made informed by EPDs or PCFs and are separate from the specific rules of the steel and cement product classifications. This is to enable buyers to make informed choices in accordance with the principle of carbon accounting they consider most appropriate.

3.12 Do you agree or disagree with the proposal that both net and gross emissions figures from production should be reported in the EERF guidance? Please explain your reasoning.

[Yes, Strongly agree; Yes, Agree; Maybe/Undecided; No, Disagree; No, Strongly disagree]

[Open text]

[92] Mineral Products Association, November 2023, Figure 6 of MPA Cement - Delivering Net Zero UK Cement - Unlocking Barriers to Decarbonising Dispersed Sites.

[93] BS EN 15804: 2019, Annex D.3.2

Accounting for non-biogenic waste fuels when a single figure is required

When a single emissions figure is required (for instance when comparing products in a procurement process) the government's proposal is to use the gross emissions, which include emissions from non-biogenic waste fuels rather than relying upon net emissions which exclude the emissions from non-biogenic waste fuels. This would increase transparency of the data and ensure that all emissions are accounted for. The proposal would align with the Industrial Deep Decarbonisation Initiative's (IDDI) approach that the emissions from non-biogenic waste fuels should be considered in a product's gross emissions value.[94]

The government's proposal is intended to ensure measurement is robust and comprehensive (assessment criterion 3). Reporting gross emissions ensures consistency with methods outlined by the Green House Gas Protocol, as well as the Science Based Targets initiative, which identifies gross emissions as the basis for target setting in the cement sector.

3.13 Do you agree or disagree with this proposal to use gross emissions (which include emissions from non-biogenic waste) when a single emissions figure is required? Please explain your reasoning.

[Yes, Strongly agree; Yes, Agree; Maybe/Undecided; No, Disagree; No, Strongly disagree]

[Open text]

Ensuring data quality

Ensuring high quality input data is crucial for credible results and enabling accurate product comparisons. Data quality is a known issue in embodied emissions reporting frameworks.[95] In the previous consultation, most respondents prioritised accuracy despite the associated administrative burden.[96]

The government is exploring options to improve data accuracy, as discussed in Chapter 2. It is also proposed that this guidance recommend producers report according to the new BS EN 15941 standard on data quality in EPDs.[97] This standard emphasises transparency in data sources (e.g. input products) and evaluates input data quality, focussing on two key aspects:

- **Temporal representativeness:** How up to date the information is
- **Geographical representativeness:** How relevant the data is to the product's production location. For instance, if a steel fabricator uses an emissions factor for iron production from a country with different production methods, such as less efficient blast furnaces or a different electricity grid mix, it would be less geographically representative than data from a more similar location

[94] IDDI, 2024, 'Driving consistency in the greenhouse gas accounting system', page 27

[95] Ibid.

[96] UK Government, Carbon Leakage Consultation, Question 6.6

[97] BS EN 15941:2025, 'Sustainability of construction works, Data quality for environmental assessment of products and construction work, Selection and use of data'.

Additional aspects include precision, completeness, representativeness, consistency, and data sources. Although reliance on ‘best available’ data is often unavoidable due to limitations, greater transparency in data quality would benefit buyers and encourage producers to use more primary data throughout their value chain, reducing dependence on secondary data.

3.14 Do you agree or disagree with the proposed guidance recommending reporting the embodied emissions of products in accordance with BS EN 15941? Please explain your reasoning.

[Yes, Strongly agree; Yes, Agree; Maybe/Undecided; No, Disagree; No, Strongly disagree]

[Open text]

3.15 Considering the objectives of this section and the proposed emissions reporting guidance, are there any other methodological areas where respondents think there needs to be a consistent or coordinated approach, or other considerations that the government should be aware of?

[Open text]

Chapter 4: An Embodied Emissions Reporting Framework IT system

An EERF IT system could comprise of a database, tools and a portal to access guidance and datasets. An IT system is essential for reporting product level embodied emissions data, particularly data that complies with the EERF methodology (see Chapter 3).

For producers an IT system could serve as a platform where compliance with EERF guidance can be demonstrated. Buyers, architects and designers could use it to access data to support lower carbon product purchasing decisions, optimise project designs to maximise environmental performance, as well as help identify carbon hotspots in processes and supply chains. IT systems can reduce transaction costs related to gathering information on embodied emissions, which enhances incentives to adopt carbon accounting practices and effectively utilise the collected data.

In the previous consultation, the government explored early options for an EERF IT system, which included initial proposals for the IT system's structure, reporting frequency, data verification, and public disclosure. Respondents stressed the importance of leveraging existing reporting frameworks, expertise and data sources to minimise disruption and duplication. Additionally, respondents were broadly supportive of making embodied emissions data publicly available, noting that this transparency could enable buyers to make informed purchasing decisions and incentivise buyers and producers of industrial products to take accountability for their supply chains.

The exact functionalities of this IT system are yet to be established and are explored in this consultation and in an upcoming digital discovery project. Government is exploring a centralised database for embodied emissions data for industrial products that producers and buyers can access to simplify reporting and improve data gathering, particularly for SMEs, while facilitating meaningful product comparisons for producers and buyers. The database could also be a useful source of information for policy makers, enabling better targeting of future policy measures. The database could work alongside other functionalities, such as reporting tools and a life cycle inventory, to make embodied emissions reporting more reliable, consistent, and to reduce the administrative burden of reporting.

A centralised database could support embodied emissions reporting by collecting and organising embodied emissions data for relevant products to ensure consistency and transparency. The following functionalities are explored in this chapter:

- Functionality 1: Publishing and displaying product level data
- Functionality 2: Data comparison tools
- Functionality 3: A database for life cycle emissions
- Functionality 4: Product benchmarking tools
- Functionality 5: Reducing administrative burden

Proposed database functionalities

This section explores the functionalities that could make up the EERF IT system. These are not mutually exclusive. The final IT system design could include two or more of these functionalities and will also be explored through the digital discovery project. The discovery project is expected to run in 2025-2026, with a goal of developing an EERF IT system by the late 2020s.

Examples of existing databases

Ökobaudat (German database) is a database of LCA and EPD datasets for generic and specific construction materials and components. Ökobaudat typically uses Sphera datasets and is a free to access database with search functionality and downloadable PDF formats.

INIES (French database) is managed by construction stakeholders and public authorities and one of its functions is as a reference database for EPDs for construction works. This database is government developed, free and mandatory to use for sustainable building projects in France. INIES has generic and specific datasets[98] that are verified by independent third parties. INIES also has a life cycle inventory for secondary data. Datasets are searchable and downloadable as PDFs.

Built Environment Carbon Database (BECD) is a database established by the Royal Institute of Chartered Surveyors and the Building Cost Information Service. It is specific to the UK regions and could be a good database to support or build upon; however, it currently has few public EPDs.

Embodied Carbon in Construction Calculator (EC3) is a US not-for-profit database that gathers product data from different standards in one place, and applies corrections based on life cycle stages included and potential uncertainty. It is designed to allow benchmarking, assessment and reductions in embodied carbon, and is focussed on the upfront supply chain emissions of construction materials.

Functionality 1: Publishing and displaying product level data

The government is minded to build or endorse a database that has the main functionality of enabling producers to report product level data that complies with EERF guidance. Buyers could then use this database to compare products and make informed purchasing decisions The aim would be to provide a single, centralised source of data in a standardised format.

The government will also explore whether users should have access to datasets that are not EERF-compliant and how this database would interact with other policies such as Product Classifications discussed in Chapter 5.

[98] INIES uses the Environmental and Health Declaration Form (FDES), which is similar to EPDs but has France specific environmental requirements (NF EN 15804/CN).

This database could support the availability and accessibility of product level embodied emissions data by:

- Acting as a platform for the publication of EERF compliant datasets
- Providing a searchable registry of EERF compliant datasets for industrial products
- If expanded to include datasets that do not comply with EERF guidance, it could also draw together data from multiple existing sources, including product data from other countries
- The portal could also be a home for secondary data datasets, EERF guidance, EPD templates, and other tools

In the previous consultation, concerns were raised that some products are bespoke, and producers and buyers may have concerns about making data for highly specialised products publicly available. The proposals at this stage are voluntary, which mitigates this risk. The government will also look at how to integrate these concerns into the design and functionality of the database.

To make embodied emissions reporting more accessible the government intends to present data in a way that is easy to search for, read and visualise to enable meaningful comparisons between products. This would include functionality to allow users to search for embodied emissions data for specific product types based on criteria such as product category, data type, company name, location, product carbon footprint (if available), product classifications (described further in Chapter 5) and data type, amongst others.

Governments in other countries have developed or endorsed databases to help producers, designers, and buyers access accurate environmental data, facilitating more sustainable decision-making by enabling meaningful comparison.

The government is also aware of the development of Digital Product Passports (DPPs) in the European Union, and emerging proposals for the IT system that will underpin this. The government will need to consider the potential interactions between this system and the EERF and whether it is appropriate to pursue interoperability. Further details on DPPs are set out in Chapter 7.

4.1 Where do you currently get data for product level embodied emissions reporting from? [select all that apply]

Examples: Built Environment Carbon Database (BECD);
Embodied Carbon in Construction Calculator (EC3);
Institute of Civil Engineers (ICE) Database;
INIES (French database);
Ökobaudat (German database);
Other (please specify)

[Open text]

4.2 What limitations, if any, do you or your business currently face when accessing or publishing product level embodied emissions data?

[Open text]

4.3 Do you agree or disagree that a UK repository for embodied emissions data could help your business report emissions data? Please explain your reasoning.

[Strongly Disagree; Disagree; Neither Agree nor Disagree; Agree; Strongly Agree]

[Open text]

Functionality 2: Data comparison tools

Data comparison tools work alongside functionality 1 (publishing and displaying product level data).[99] The intention would be to enable users to compare multiple products automatically within the user interface, eliminating the need for manual processes such as downloading and reviewing PDFs. This would streamline comparisons and improve usability. The government could also consider adopting data formats that enable EPD data to be integrated directly into the database. This approach, similar to the functionality seen in tools from EC3 and others, would make the data more accessible and practical compared to static PDF formats.

Functionality 3: A life cycle inventory

A life cycle inventory database would look to provide the secondary data that is used to generate product level emissions. This could include facilitating access to quality data that is specific to UK industry.

This life cycle inventory could help reduce the administrative costs for producers creating EPDs and address issues with comparability. As discussed in chapter 3, secondary data is essential in the creation of EPDs, as it helps fill gaps when primary data is unavailable or incomplete. A life cycle inventory could improve comparability if EERF guidance is expanded to explicitly require its use. It could also support businesses in understanding the emissions across their supply chains and could make access to secondary data more affordable for UK businesses. However, this could create additional burden for international companies.

4.4 Should the UK produce its own life cycle inventory with regularly updated, regionally specific data? Note that this could be built from scratch or upon existing inventories. Please provide details of any potential benefits or concerns, as well as how these may impact the completion of a life cycle analysis.

[Yes, Strongly support; Yes, Support; Maybe/Undecided; No, Do not support; No, Strongly do not support]

[Open text]

[99] There are number of already existing tools such as the Global Cement and Concrete Association EPD generator https://gccaepd.org/tool

Functionality 4: Product benchmarking tools

Product benchmarking for EPDs involves assessing a product's environmental performance against industry standards or similar products. A benchmarking tool could enhance the proposed database by enabling comparisons of EPDs to similar products, making it easier to identify options with lower environmental impacts. This tool could be integrated into an EPD database as part of the EERF IT system and could provide buyers with more valuable insights into a product's environmental performance, supporting more sustainable purchasing decisions. It could also help producers better understand how their products rank within the market. This could run parallel to the product classifications discussed in Chapter 5.

4.5 Would a product benchmarking tool that interacts with the proposed product level embodied emissions reporting database be helpful in making meaningful product comparisons and informing buying decisions? Please explain your reasoning.

[Yes, Strongly agree; Yes, Agree; Maybe/Undecided; No, Disagree; No, Strongly disagree]

[Open Text]

Functionality 5: Reducing administrative burden

Respondents to the previous consultation highlighted the need to reduce the cost of reporting. Alongside producing standardised guidance and the creation or endorsement of a database, the government is exploring additional measures to reduce the administrative burden and complexity of producing embodied emissions data. These measures could include:

- Downloadable templates in a standardised format to simplify creating EPDs
- Automated calculations, potentially including pre-verified data
- Tools that support interoperability with other reporting frameworks, e.g. the UK CBAM

The government is currently conducting research into possible solutions to reduce the administrative costs of reporting.

4.6 What tools, such as an EPD generator or a product carbon tool, if any, do you currently use when producing embodied emissions data? Please provide details of the features and benefits.
Option 1: EPD generator tools

Option 2: product carbon tool

Option 3: Other (please specify)

[Open text]

4.7 What tools, such as an EPD generator or a product carbon tool, if any, should government explore producing to reduce the administrative burden of producing EPDs? Please provide details of the features and benefits.

[Open text]

Chapter 5: Product classifications for embodied emissions

Product classifications create a structure for differentiating between lower and higher emission products by setting thresholds and bandings for products based on their embodied emissions. These can create ratings (such as A to G) to help buyers compare and understand the climate impact of their product purchases on a like-for-like basis. Product classifications can also help clarify what 'good' looks like and define what constitutes a low carbon product.

In the previous government response, the government committed to work with industry to establish a system of product classifications to benchmark the carbon content of in-scope industrial products. This chapter seeks views on how the government should approach the use of product classifications and which to recommend for green procurement policies (as set out in Chapter 6).

Part 1 of this chapter explores the government's cross-cutting approach to product classifications, including whether to use a single classification model or multiple models per sector. Parts 2, 3 and 4 outline sector-specific options for steel, concrete, and cement, respectively. Further background and detail on the options can be found in the technical annex.

The assessment criteria were used to conduct an initial qualitative review of these options, evaluating their alignment with government objectives and their potential role in policies such as best practice procurement guidance. A more thorough assessment of each option, incorporating feedback from this consultation, will inform the final decision on the government's approach to product classifications.

Change of terminology

In 2024, the government renamed this policy from 'voluntary product standards' to 'product classifications for embodied emissions', or simply 'product classifications'. This change better reflects the policy's intent and aligns with industry terminology. These classifications remain voluntary, meaning manufacturers are not required to meet any specific classification. Note that broadly equivalent terms, such as 'definitions', are used by other organisations.

5.1 Do you currently use any form of product classifications, whether as a manufacturer, supplier, or buyer? If yes, please specify which one(s)?

[Yes; No; I don't know]

[Open text]

5.2 If you answered no to Question 5.1, are you interested in starting to use product classifications? Please explain your reasoning, and details of any potential benefits, barriers, or challenges (such as financial implications) you foresee.

[Definitely yes; Probably yes; Unsure; Probably not; Definitely not]

[Open text]

Cross-cutting considerations

Whether to use existing product classification models

The government is considering whether to use a combination of existing models that have been developed for product classifications rather than developing its own. This is to promote and align existing good practices, thereby avoiding duplication and minimising confusion. However, if no existing model is ultimately assessed to be appropriate for use in policies such as green procurement, it may be necessary to develop a new model or adapt an existing model in collaboration with industry.[100]

This approach has been informed by industry feedback that suggests the government could play a role in ensuring a consistent and unified approach to the use of product classifications by government, producers, and buyers. This also aligns with the assessment criteria 'operationally ready' (criterion 4) which considers alignment with existing industry approaches and whether there is significant (expected or observed) uptake.

This approach also reflects the government's intention to use sector-specific models rather than pursue a single product classification that applies universally to steel, cement, and concrete. The government understands that a single, cross-system approach does not currently exist. Developing one would also be expected to be challenging as each sector has unique characteristics that could prevent like-for-like comparisons. Instead, this consultation focusses on evaluating the sector-specific models that already exist and their different methodological foundations.

5.3 Is there anything that the government should consider regarding its intention to use existing, sector-specific product classifications, rather than develop its own (including any single, cross-sector model)?

[Open text]

Whether to take a permissive or prescriptive approach

The government is considering whether to adopt a permissive or prescriptive[101] approach to the use of product classifications. As the government assesses the product classification options outlined in this chapter, it may find that multiple models align with its goals and are

[100] This approach has been encouraged by the International Energy Agency (IEA), whose definitions for near zero and low emissions steel and cement are intended to be adapted by individual countries.

[101] Similarly to in Chapter 2, a prescriptive approach could recommend buyers to only use a single product classification, while a permissive approach could recommend using any of multiple options.

suitably robust. In this scenario, adopting a permissive approach that enables the use of more than one suitable model, may be preferable to a prescriptive approach that encourages the use of a single model per sector.

A permissive approach could provide flexibility by allowing the use of tailored approaches that address the diverse needs of manufacturers and buyers and support more effective application across different product types within a sector. This would give buyers options, some of which may better align with their wider sustainability goals and operational priorities.

However, adopting a prescriptive approach, where all stakeholders are advised to use the same product classification model, could improve consistency across each sector and facilitate easier comparison (assessment criterion 2). The use of multiple models could also be confusing for buyers, as existing models can be based on different methodologies and use different ratings, meaning that the results may not be like-for-like. For instance, the same product could be given an 'A' rating under one model and a 'C' rating under another.[102]

To mitigate the risks of confusion from the use of multiple models, the government could adopt a permissive approach but take additional steps to support interoperability, for example by offering supplementary guidance or conversion tools. Some efforts are already underway. ConcreteZero, for instance, has determined the equivalence of its Low Embodied Carbon Concrete Threshold to a range of established product classifications, as well as setting out what constitutes 'equivalence' to support future mapping to emerging product classifications.[103]

5.4 Which option for the approach to product classifications would be most appropriate as a basis of green procurement policies? Please explain your reasoning.

Option 1: A prescriptive approach (recommending the use of one product classification per sector)

Option 2: A permissive approach without providing any tools to support interoperability (recommending the use of multiple product classifications per sector)

Option 3: A permissive approach but also providing any tools to support interoperability (recommending the use of multiple product classifications per sector)

Option 4: Unsure

[Open text]

[102] A C90/105 concrete product with 150kgCO2e would be rated an 'A' using the Global Cement and Concrete Association's (GCCA) Global Ratings adapted for the UK by the Mineral Products Association (MPA), but a 'C' under Arup-Innovate UK's (UKRI) Universal Classification for embodied carbon of concrete.

[103] ConcreteZero's threshold is equivalent to the top of: (i) Band C on the GCCA's Global Definitions, (ii) Band D on Arup-UKRI's Universal Classification, and (iii) Band 2 on the 2024 Low Carbon Concrete Group's (LCCG) Market Benchmark.

Steel product classifications

Steel is a highly traded and versatile commodity used in buildings, infrastructure, transport, machinery and consumer goods. Despite the availability of alternatives, steel continues to be used widely in construction and is often preferred due to its high strength, durability, relatively low cost and recyclability.

Decarbonising the UK steel sector is crucial to achieving the government's net zero target. Measures to support this transition are already underway, with significant transformations taking place. As outlined in the recent steel strategy consultation,[104] the UK has the potential to gain a competitive advantage in producing low emission steel, helping drive economic growth and decarbonisation while ensuring industrial sustainability. See the technical annex for further information on steel production and products.

The government has identified five steel product classifications, developed by international and sector-led initiatives, that it considers to be viable options for use in UK policies such as green procurement. These options appear to be the most established approaches in the sector, a view informed by engagement with domestic and international steel stakeholders. The assessment criteria have been used to consider each option's potential advantages and disadvantages, and alongside the results of this consultation, will be used to make final decisions on which option(s) should be recommended.

The options under consideration are:

- Option 1: ResponsibleSteel Decarbonisation Progress Levels (DPLs)[105]
- Option 2: Low Emission Steel Standard (LESS)[106]
- Option 3: Global Steel Climate Council's (GSCC) product standard[107]
- Option 4: Green steel scale in the Construction Leadership Council's (CLC) Five Client Carbon Commitments (5CCCs)[108]
- Option 5: U.S. Environmental Protection Agency's (EPA) approach to setting limits for low embodied carbon steel[109]

Note that the ResponsibleSteel and LESS options are based on the International Energy Agency's (IEA) definition for near zero and low emission crude steel, published in May 2022 (see the technical annex for further detail).[110] As the IEA's model is designed to offer a foundation for organisations to develop their own operable product classifications, the IEA's definitions are not being considered as a standalone option.

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[104] UK Government, February 2025, 'The steel strategy: the plan for steel'

[105] ResponsibleSteel, October 2024, 'ResponsibleSteel international production standard version 2.1.1'

[106] German Steel Association (WV Stahl), March 2025, 'Rulebook for the classification system of the Low Emission Steel Standard (LESS) version 1.1'

[107] GSCC, July 2024, 'The steel climate standard'

[108] CLC, March 2025, 'Five Client Carbon Commitments: An update from the construction industry'

[109] U.S. EPA, December 2022, 'Interim determination on low carbon materials'

[110] IEA, May 2022, 'Achieving net zero heavy industry sectors in G7 members'

5.5 Are there any other steel product classification options that the government has not identified and should consider as potentially suitable, in particular for use in green procurement policies? If so, please provide details.

[Open text]

Key differences of steel product classifications

The identified steel product classifications vary in several key aspects, which could have implications for their effectiveness if adopted more widely. These features have been evaluated using the assessment criteria and are summarised below:

- **Use of a scrap sliding scale:** Industry engagement has highlighted this as a key factor in the selection of a product classification. ResponsibleSteel and LESS options apply a scrap sliding scale based on the IEA's definitions. The advantages and disadvantages of this approach are explored in the next section, considering whether it: incentivises decarbonisation including avoiding unintended consequences and aligning with resource efficiency and circularity principles (criterion 1), enables product comparison (criterion 2), and meets buyers' needs (criterion 4)
- **Product scope:** The range of steel products in scope of the product classifications can affect comparability (criterion 2). For instance, ResponsibleSteel and GSCC exclude stainless steel and products with more than 8% alloy content.[111] This is due to the significant emissions associated with the use of alloys for these types of products which they claim require separate thresholds. The LESS, GSCC, and CLC product classifications exclude steel products that are not hot rolled, such as some forged steel, while LESS also omits stainless steel, seamless pipes, ingots and cold drawn steel.[112] However, the impact of these exclusions on hindering comparability is expected to be low as 90%[113] of steel products produced globally do not include additional alloys and majority of steel products are hot rolled
- **Certification schemes:** ResponsibleSteel, GSCC, and LESS are part of broader certification schemes which may have additional requirements if used in green procurement and ecolabelling policies. They incorporate proprietary emissions reporting methodologies and verification processes that are required to achieve certification. Although these requirements may help improve robustness (criterion 3), they could also result in additional reporting burden (criterion 5)
- **Dynamic vs fixed models:** A dynamic product classification model sets bandings based on factors that can change such as the best performers in the market. In contrast, a fixed approach sets product classifications that will not change as they are based on factors such as a net zero end goal. ResponsibleSteel, CLC, and LESS use fixed thresholds that are aligned with net zero. Meanwhile, the GSCC

[111] ResponsibleSteel is developing separate technical specification for these products.

[112] The LESS rulebook will be extended in the future to capture additional manufacturing processes like stainless steel, forged steel, ingot casting and seamless pipes.

[113] Metal supermarkets, 2023, 'What Are The Different Types of Steel & Steel Grades?'

model is dynamic but still aligns with net zero, and the U.S. EPA's approach is fully dynamic and based on the best performers in the market. Both dynamic and fixed models would in principle incentivise decarbonisation (criterion 1), but it is not yet clear which is more effective

- **Product differentiation:** Some models set different product classifications for different steel products. Models also differ in whether they set more or fewer thresholds or bandings. For instance, the ResponsibleSteel option is designed only for crude steel and sets four bandings, while the GSCC option sets one threshold each for flat and long steel products (two thresholds in total). Models that distinguish between different types of steel products may better support like-for-like comparison (criterion 2). Models that set more bandings may better reflect and reward incremental improvements in decarbonisation (criterion 1)
- **Emissions reporting methodology:** The product classifications differ by system boundaries and approach to embodied emissions data measurement. This can impact comparability (criterion 2), robustness and comprehensiveness of reporting (criterion 3) and reporting burden (criterion 5). ResponsibleSteel set the system boundary up to crude steel whereas GSCC, LESS and CLC also include emissions from hot rolling. The U.S. EPA's approach captures emissions from cradle to gate for the finished steel product, which includes downstream production emissions after crude steel is produced

The table below summarises the key differences among the existing product classification options:

Option	Product Scope	Product Different-iation	Dynamic vs Fixed	Scrap sliding scale	Emissions reporting
Option 1: Responsible Steel DPLs	In scope: steel with less than 8% alloys Out of scope: steel with more than 8% alloys and stainless steel	Crude steel, four bands (Progress levels 1 to 4)	Fixed	Yes	Scope 1, scope 2 and upstream scope 3 emissions, boundary up to crude steel
Option 2: LESS	In scope: structural and reinforcing steel[114] and quality steel[115] Out of scope: stainless steel, seamless pipes, ingots, cold drawn steel and steel not hot rolled (i.e. forged steel)	Structural and reinforcing steel and quality steel, five bands (Near zero and A to D)	Fixed	Yes	CO2 emissions only for scope 1 and scope 2, CO2e for upstream scope 3 emissions, boundary up to hot rolled steel (first heating) EU Emissions Trading System data can be used to determine scope 1 emissions

[114] Includes steel with less than 8% alloys

[115] Includes steel with more than 8% alloys

Option 3: GSCC's product standard	In scope: steel products with less than 8% alloys Out of scope: steel products with more than 8% alloys, stainless steel and steel not hot rolled (i.e. forged steel)	Flat steel and long steel, one threshold each	Dynamic	No	Scope 1, scope 2, and upstream scope 3 emissions, boundary up to hot rolled steel
Option 4: Green steel scale in the CLC's 5CCCs	In scope: steel products used in construction only Out of scope: steel not hot rolled (i.e. forged steel)	Hot rolled steel, six bands (A to F)[116]	Fixed	No	Scope 1, scope 2, and upstream scope 3 emissions, boundary up to hot rolled steel
Option 5: U.S. EPA's approach to setting limits for low embodied carbon steel	If this option is used, the government will likely determine the product scope with industry in line with the U.S. EPA's approach[117]	Multiple steel product categories, three bands (Top 20%, top 40%, top 50%)	Dynamic	No	Environmental Product Declaration (EPD) based approach, cradle to gate (A1 to A3)

Table 3: Summary of key differences between steel product classification options

5.6 Do you agree or disagree that the above is an accurate understanding of the key differences between steel product classifications? Please explain your reasoning, and if any other differences should be considered.

[Yes, Strongly agree; Yes, Agree; Maybe/Undecided; No, Disagree; No, Strongly disagree]

[Open text]

[116] This does not include band G which does not have an upper threshold on emissions.

[117] As per the U.S. EPA's approach, this will likely cover multiple steel product categories, including but not limited to hot rolled sections, plates, steel reinforcing bars/rebar. It also includes assemblies comprised of at least 80% by total cost or total weight of these steel product categories.

Whether or not to use a scrap sliding scale-based approach

Steel scrap[118] is a highly traded, yet limited commodity, the use of which can help substantially reduce the emissions of steel production and support a more circular economy (see the technical annex for more detail). Based on engagement with the steel industry, a key consideration in selecting which product classification to use in green procurement policies is whether the model applies a scrap sliding scale. A sliding scale sets thresholds that change based on the proportion of scrap used in production. Producers using higher proportions of scrap face a lower (stricter) threshold than producers using lower proportions of scrap, meaning additional decarbonisation steps must be taken beyond scrap utilisation to meet better ratings. Figure 3 provides an example of a sliding scale by the IEA.

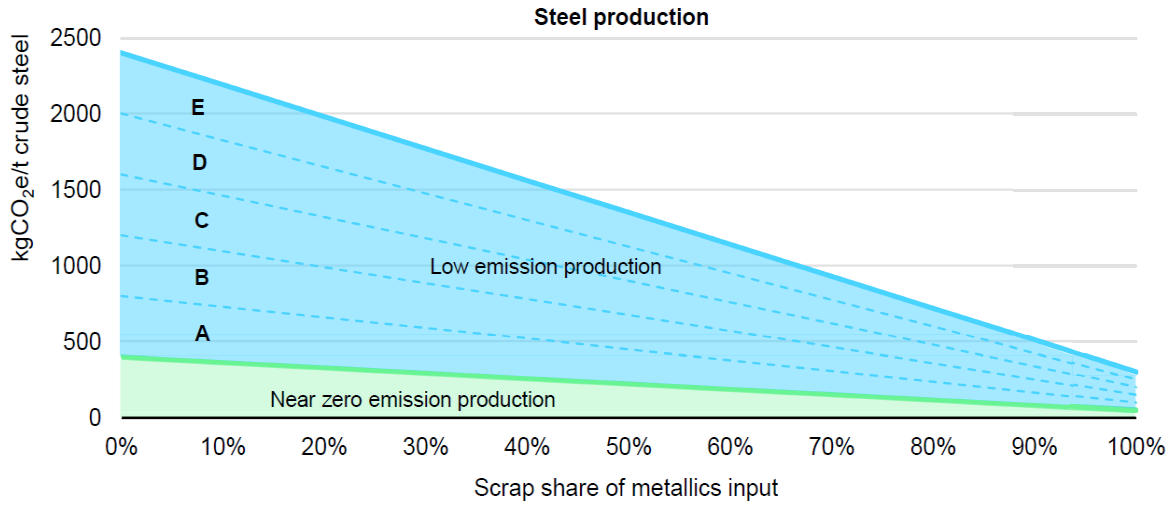

Figure 3: IEA's definition for near zero and low emission crude steel
Source: IEA, May 2022, 'Achieving net zero heavy industry sectors in G7 members'

A sliding scale offers the following potential advantages:

- **Supports global sustainable scrap use:** A sliding scale could disincentivise economies with abundant scrap and alternative decarbonisation options from maximising the domestic use of scrap and thus reducing exports. This could help ensure that emerging markets and developing economies, without alternative decarbonisation options, maintain access to scrap

- **Incentivises decarbonisation in both primary and secondary steelmaking**:[119] The varying thresholds could reflect intrinsic differences between primary and secondary steelmaking and their different decarbonisation pathways. Such an approach would reward lower emission steel from both routes and encourage decarbonisation beyond solely using scrap. This is based on the assumption that there will still be a need for primary steelmaking in 2050 to meet global steel demand[120]

[118] Steel scrap is discarded steel from manufacturing waste and recovered steel from buildings, infrastructure, equipment, vehicles and products discarded at their end of life.
[119] Primary steelmaking utilises iron ore as the main raw material input and secondary steelmaking uses scrap steel.
[120] IEA, May 2021, 'Net Zero by 2050'

- **Mitigates artificial scrap price increases**: As global demand for scrap rises, prices are expected to increase. A sliding scale could help mitigate the risk of low carbon product market policies exacerbating any price rises

However, a sliding scale could also result in the following potential disadvantages:

- **Disincentivises domestic resource efficiency:** A sliding scale may discourage better utilisation of domestic scrap in the UK, reducing investments in recycling capacity and hindering the creation of circular supply chains[121]
- **Reduces like-for-like comparison:** A sliding scale with stricter thresholds for secondary steelmaking could result in primary and secondary steel products receiving the same rating, despite having substantially different embodied emissions. This could hinder product comparison and lead buyers to choose products with higher embodied emissions
- **Adds complexity for buyers:** A sliding scale may make it difficult for buyers to identify low emission steel for green procurement and manage overall project emissions.[122] During industry engagement, some buyers expressed a preference for the lowest emission options regardless of scrap content

A review of sliding scale options and engagement with industry so far suggests that certain design features could help mitigate some of these disadvantages. These include setting different thresholds for steel product categories or applying less stringent thresholds for higher scrap use. More detail is set out in options 1 and 2.

5.7 Do you agree or disagree that the government should use a steel product classification that uses a scrap sliding scale? Please explain your reasoning.

[Yes, Strongly agree; Yes, Agree; Maybe/Undecided; No, Disagree; No, Strongly disagree]

[Open text]

Assessment of steel product classification options

The following section sets out the government's initial assessment of steel product classification options, examining how the models are designed and their emissions reporting requirements. Further information on certification, reporting and verification for ResponsibleSteel, LESS, and GSCC can be found in the technical annex.

[121] The UK produces approximately 10 to 11 million tonnes of scrap annually, around 80% of this is exported, mostly to emerging markets and developing economies such as India, Egypt and Turkey. See UK Steel, 2023, page 2, 'Steel scrap: A strategic raw material for net zero steel'.

[122] Such as Lower Thames Crossing, which was granted its Development Consent Order with a fixed carbon limit. From this perspective, there would be no direct incentive to account for the use of scrap in the steel procured, as the carbon limit is based solely on embodied emissions.

Option 1: ResponsibleSteel Decarbonisation Progress Levels

In October 2024, ResponsibleSteel[123] published version 2.1.1 of the international production standard, which includes Decarbonisation Progress Levels (DPLs) to assess a steelmaking site's progress towards near zero emissions.

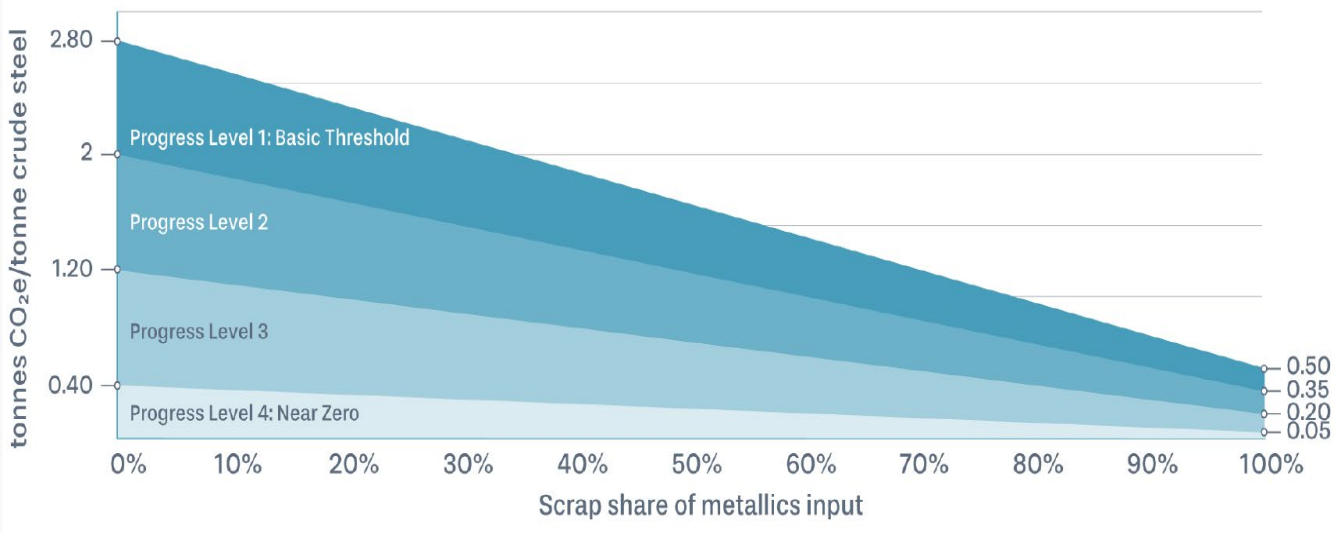

Figure 4: ResponsibleSteel DPLs
Source: ResponsibleSteel, October 2024, 'ResponsibleSteel international production standard'

The DPLs consist of four progress levels which remain fixed over time:

- Progress level 1 (basic threshold) is based on global average data from 2022 and aims to provide an achievable entry point in line with global steel emissions
- Progress levels 2 and 3 represent equidistant step changes between levels 1 and 4
- Progress level 4 (near zero) aligns with the IEA's near zero emission steel threshold

ResponsibleSteel follows a sliding scale approach based on the IEA's definitions. In May 2024, they introduced revisions to the DPLs in version 2.1 of the standard to better promote scrap recycling, increasing progress level 1 on the high scrap end of the scale by 150kgCO2e per tonne of crude steel.[124] This adjustment may help address some of the potential disadvantages associated with a sliding scale described previously.

To achieve steel certification for the site, the system boundary for reporting is up to crude steel (including casting but not further processing). However, to market and label products as certified steel, producers must also generate a product carbon footprint (PCF).[125] Auditors approved by ResponsibleSteel verify compliance with reporting requirements. Further information on the emissions reporting (including specified measurement methodologies,

[123] ResponsibleSteel is a global, not for profit organisation promoting socially and environmentally responsible near zero steel production.

[124] ResponsibleSteel, April 2024, 'Revisions to ResponsibleSteel's Principle 10: Greenhouse Gas Emissions and Climate Change'

[125] For a list of standards and methodologies that may be used to support the determination of the PCF, see ResponsibleSteel, May 2024, criterion 10.6.4, Guidance and Annexes version 1.4

sources of default values, and emissions allocation to by-products) and verification requirements can be found in the technical annex.

Potential advantages

- **Fixed and aligns with net zero**: Thresholds remain constant, allowing buyers to plan ahead and set long term targets towards progress level 4 (near zero emissions)
- **Rewards continuous improvement:** The four progress levels recognise and incentivise incremental progress. It offers fewer levels than other options like LESS and the CLC, however producers marketing products as certified steel can still demonstrate emissions reductions for their products through the PCF
- **Operational:** ResponsibleSteel DPLs are ready to be used by producers. The U.S. Steel's Big River Steel site in Arkansas is the first site to achieve steel certification
- **Enables like-for-like comparison:** Setting the system boundary up to crude steel, the common production stage for all steel products, enables like-for-like comparison across sites producing different products as they are compared at this stage.[126] This avoids the need to establish product classifications for every product category[127]

Potential disadvantages

- **Limited coverage of environmental impacts (GHG emissions):** The system boundary excludes GHG emissions from downstream production processes, which can account for nearly 25% of total steel production emissions.[128] The impact of this varies as products like reinforcing steel for construction may have lower downstream emissions, while steel products used in automotive or defence may have more

5.8 Is there anything else the government should consider regarding the ResponsibleSteel Decarbonisation Progress Levels (DPLs), or any points of the description, potential advantages, or disadvantages that you disagree with?

[Open text]

5.9 Do you believe that the emissions reporting and verification requirements to use the ResponsibleSteel Decarbonisation Progress Levels (DPLs) are robust and appropriate for use in green procurement policies, or not? Please explain your reasoning.

[Not robust or appropriate at all; Somewhat not robust or appropriate; Undecided; Somewhat robust and appropriate; Very robust and appropriate]

[Open text]

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[126] This aligns with the COP29 statement on the steel standards principles, which aims to establish a common boundary for emissions intensity reporting from mining to crude steel, in addition to existing reporting points, see 'Steel Standards Principles: Statement for COP29'

[127] The World Steel Association identified 17 steel products for their study, see LCI study - 2021 data release

[128] Carbon Research, 2024, Fig. 1(b), 'Greenhouse gas control in steel manufacturing'. This includes direct and indirect emissions from rolling, treatment, fabrication, and by-products.

Option 2: Low Emission Steel Standard

In 2024, the German Steel Association (WV Stahl [129]), based on a stakeholder process organised by the German Federal Ministry for Economic Affairs and Climate Action (BMWK), [130] published the Low Emission Steel Standard (LESS) rulebook. The rulebook outlines the classification system, emissions reporting methodology, and verification requirements for certifying steel products.

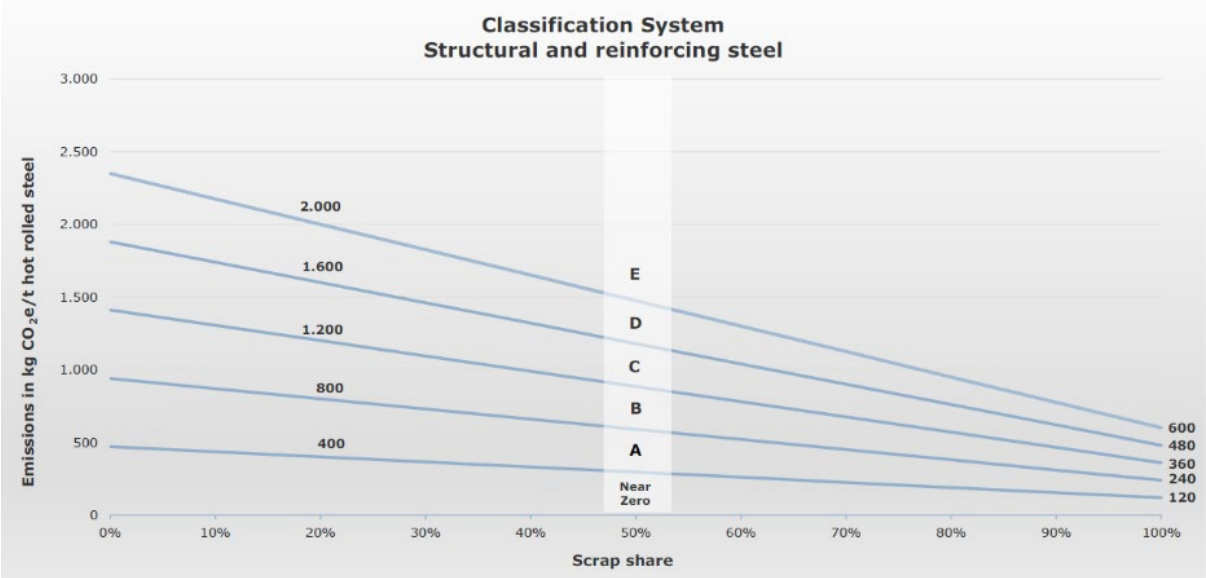

Figure 5: LESS classification system for structural and reinforcing steel
Source: WV Stahl, March 2025, 'Rulebook for the classification system of the LESS'

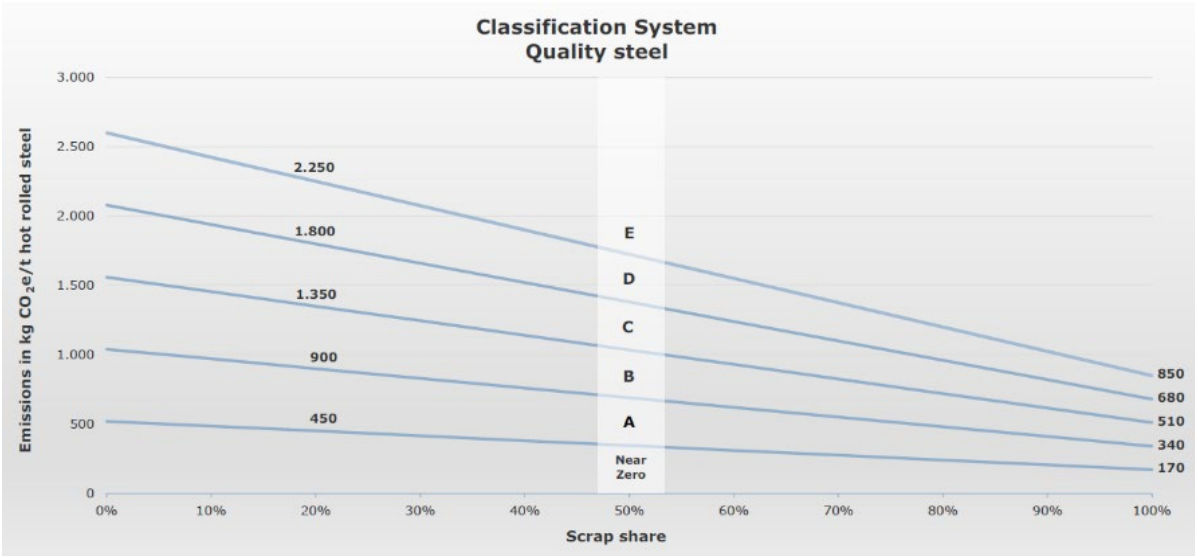

Figure 6: LESS classification system for quality steel
Source: WV Stahl, March 2025, 'Rulebook for the classification system of the LESS'

[129] WV Stahl represents Germany's steel industry, which aims to achieve climate neutrality by 2045.

[130] Federal Republic of Germany, September 2024, 'Lead markets for climate-friendly basic materials'

LESS defines a near zero emission band and bands A to D, with fixed thresholds that do not change over time.[131] It adopts a sliding scale based on the IEA's definitions. As per figure 5 and 6, product classifications are set separately for quality steel and structural and reinforcing steel, which could mitigate some of the disadvantages associated with a sliding scale by improving like-for-like comparisons of products.

The system boundary for reporting is up to hot rolled steel, including initial pass in the hot rolling mill only and no further downstream processes. To determine scope 1 emissions, producers can use pre-verified data from the EU Emissions Trading System (EU ETS), wherever possible. Verification is undertaken by certification bodies approved by LESS. To use the LESS label, producers must report global warming potential (GWP) in line with an EPD or PCF standard required by buyers.[132] Further information on the emissions reporting (including specified measurement methodologies, sources of default values, and allocation to by-products) and verification requirements can be found in the technical annex.

Potential advantages

- **Fixed and aligns with net zero:** Thresholds remain constant, allowing buyers to plan and set long term targets towards near zero emissions
- **Rewards continuous improvement:** The five bands incentivise incremental decarbonisation, recognising and rewarding producers for emissions reductions. The LESS label also displays GWP, making improvements visible
- **Operational:** LESS is ready to be used. Thus far, three certification bodies have been approved by LESS to undertake verification[133]
- **Enables like-for-like comparison:** Thresholds are set higher for quality steel compared to structural and reinforcing steel to reflect differences in chemical composition and production requirements, enabling more accurate like-for-like comparisons
- **Comprehensive environmental impact (GHG emissions):** Unlike ResponsibleSteel, LESS includes emissions from hot rolling within its system boundary, incentivising decarbonisation in this critical production stage, which accounts for 20 to 30% of total emissions.[134] However, as LESS only includes single heating, the impact may be lower
- **Minimises reporting burden:** EU producers can reuse their ETS data for scope 1 emissions, reducing the need for new calculations. UK producers may benefit, as the UK ETS currently aligns with the EU system

[131] Thresholds for bands A to D are multiples of the threshold for the near zero band, such that band A is double that of the near zero band, band B is triple, and so forth.

[132] For a list of standards accepted to determine the PCF or EPD, see LESS aisbl (international non-profit organisation), March 2025, page 2, Requirements for the LESS label

[133] LESS, 'Approved Certification Bodies'

[134] Arup, June 2023, page 2, 'Embodied Carbon steel'

Potential disadvantages

- **Reduces like-for-like comparison:** Including hot rolling emissions in the system boundary adds variability in comparisons, as these emissions differ by product type. This introduces a trade-off between capturing more emissions and comparability. However, LESS may mitigate this by adjusting thresholds for different steel product categories and only including single heating

- **Limited coverage of environmental impacts (GHG emissions):** The system boundary is only up to hot rolled steel (single heating) and excludes the full hot rolling process and further downstream production emissions. Additionally, emissions reporting is limited to CO2 for scope 1 and scope 2 emissions, excluding other GHGs (though they are generally negligible in these categories)[135]

5.10 Is there anything else the government should consider regarding the Low Emission Steel Standard (LESS), or any points of the description, potential advantages, or disadvantages that you disagree with?

[Open text]

5.11 Do you believe that the emissions reporting and verification requirements to use the Low Emission Steel Standard (LESS) are robust and appropriate for use in green procurement policies, or not? Please explain your reasoning.

[Not robust or appropriate at all; Somewhat not robust or appropriate; Undecided; Somewhat robust and appropriate; Very robust and appropriate]

[Open text]

Option 3: Global Steel Climate Council's (GSCC) product standard

The GSCC published the Steel Climate Standard in 2023, which includes a product standard defining lower emission flat and long steel products.[136]

Unlike ResponsibleSteel and LESS, GSCC does not use a sliding scale. Instead, it has established a single, time bound glidepath from 2022 to 2050, with separate trajectories for flat and long steel products, both converging at near zero emission.[137]

[135] Transition Pathway Initiative, January 2021, page 12, 'Carbon performance assessment of steel makers methodology note'

[136] GSCC is a non-profit association dedicated to advancing climate strategy for the steel industry.

[137] Separate thresholds were established due to differences in their chemical composition and thus embodied emissions

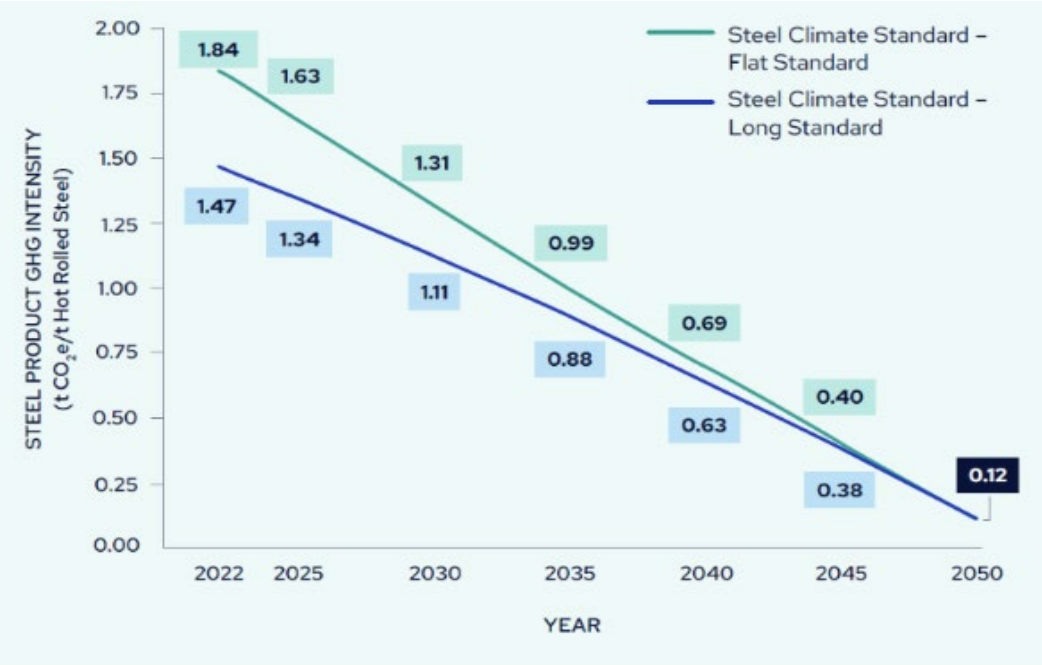

Figure 7: GSCC's product standard for flat and long steel products
Source: GSCC, July 2024, 'The steel climate standard'

Thresholds are based on World Steel Association (worldsteel) life cycle inventory (LCI) data from 2020 and GSCC's decarbonisation glidepath,[138] and may be adjusted to remain aligned with the latter, which is reviewed at least every five years.

The reporting system boundary extends up to hot rolled steel. Independent third-party verification is undertaken by certification bodies approved by GSCC. Further information on the emissions reporting (including specified measurement methodologies, sources of default values, and allocation to by-products) and verification requirements can be found in the technical annex.

Potential advantages

- **Dynamic and aligns with net zero:** Thresholds may be updated to maintain alignment with GSCC's decarbonisation glidepath, helping users assess whether a product's emissions are high or low relative to the global average.[139] Thresholds converge to near zero in 2050, allowing buyers to set long term targets
- **Operational:** The product standard is available for producers to use. Thus far, producers have not been certified against the product standard. The Construction Leadership Council (CLC) incorporates GSCC's system boundary for its green steel scale, discussed in Option 4

[138] The GSCC's decarbonisation glidepath is based on the IEA's Net Zero by 2050 Roadmap and is specifically used by producers to set science-based emissions targets (SBETs) as per the Steel Climate Standard.
[139] The GSCC's decarbonisation glidepath may be adjusted based on the latest climate science, advancements in decarbonisation technology and its deployment within the sector.

- **Enables like-for-like comparison**: Separate thresholds for flat and long steel products account for differences in chemical composition and production requirements, enabling more accurate like-for-like comparisons
- **Comprehensive environmental impact (GHG emissions):** Unlike ResponsibleSteel, GSCC's system boundary includes emissions from hot rolling

Potential disadvantages

- **Does not reward continuous improvement:** The product standard has a threshold each for flat and long steel products, rewarding production that falls below the global average trajectory towards near zero emissions. The use of one threshold does not recognise or reward incremental decarbonisation efforts by producers like the other options with multiple thresholds and bands
- **Reduces like-for-like comparison:** Including hot rolling emissions in the boundary may complicate direct comparisons, as these emissions vary across different steel products. This introduces a trade-off between capturing more emissions and comparability, and may be further impacted by GSCC's inclusion of emissions from the entire hot rolling process
- **Limited coverage of environmental impacts (GHG emissions):** The system boundary is up to hot rolled steel and thus omits GHG emissions from additional downstream production processes like cold rolling, coating and fabrication for the finished steel product

5.12 Is there anything else the government should consider regarding the Global Steel Climate Council's (GSCC) product standard, or any points of the description, potential advantages, or disadvantages that you disagree with?

[Open text]

5.13 Do you believe that the emissions reporting and verification requirements to use the Global Steel Climate Council's (GSCC) product standard are robust and appropriate for use in green procurement policies, or not? Please explain your reasoning.

[Not robust or appropriate at all; Somewhat not robust or appropriate; Undecided; Somewhat robust and appropriate; Very robust and appropriate]

[Open text]

Option 4: Green steel scale in the Construction Leadership Council's Five Client Carbon Commitments

The Construction Leadership Council (CLC) launched the 'Five Client Carbon Commitments' (5CCCs) in April 2024 to encourage UK construction clients to drive demand for low carbon solutions.[140] The fourth commitment, 'eliminate the most carbon intensive steel products,' asks organisations to set dates for progression up the green steel scale, phasing out construction products that use more carbon intensive steel.

The CLC's green steel scale is based on the GSCC's decarbonisation glidepath,[141] with threshold values assigned to bands A to G. This model does not attempt to define what constitutes green steel, as band G includes emissions above 1470kgCO2e per tonne of hot rolled steel.

Figure 8: The Construction Leadership Council (CLC)'s green steel scale
Source: CLC, March 2025, 'Five Client Carbon Commitments'

Buyers determine their own timelines for progression up the scale and are not required to use GSCC's decarbonisation glidepath or any specific framework when setting targets. Like GSCC, the CLC's green steel scale does not use a sliding scale.

The emissions calculation aligns with GSCC's system boundary,[142] as discussed in Option 3. The CLC does not specify verification requirements, however its guidance[143] encourages buyers to include EPD requirements in their contracts, noting other approaches may be possible. It is therefore likely EPDs are utilised to verify whether a product meets the ambition set by buyers on the green steel scale during procurement.

[140] The CLC works with the construction industry and government to improve the industry's productivity, skills, safety, and sustainability.
[141] GSCC, page 42, 'The steel climate standard'
[142] GSCC, Appendix B, 'The steel climate standard'
[143] CLC, 5 Client Carbon Commitments, Hints and tips

Potential advantages

- **Fixed and aligns with net zero:** Buyers can plan and set long term targets towards near zero (band A) as thresholds will remain constant over time and not be revised
- **Rewards continuous improvement:** The use of multiple bands like A to G, with progressively lower emission thresholds incentivises the sector to decarbonise incrementally towards a better band
- **Operational:** The green steel scale is being used by nine major UK public sector buyers, who have signed up to the 5CCC, and have set dates for which their construction sites will achieve the bands[144]
- **Comprehensiveness of environmental impacts (GHG emissions):** As the GSCC's system boundary is used, the same advantage for GSCC on page 73 applies

Potential disadvantages

- **Reduces like-for-like comparison:** As the GSCC's system boundary is used, the same disadvantage for GSCC on page 73 applies. Additionally, the CLC's green steel scale is not set differently for different steel product categories and therefore does not account for differences in chemical compositions and production requirements.[145] This could hinder like-for-like comparisons for these products. Although the model itself does not explicitly differentiate between flat steel and long steel, CLC's guidance[146] encourages buyers to consider differentiating between the two when setting their ambition. In practice, some buyers have set more ambitious dates for steel products like rebar (long steel) compared to plate (flat steel)
- **Limited coverage of environmental impacts (GHG emissions):** As the GSCC's system boundary is used, the same disadvantage for GSCC on page 73 applies

5.14 Is there anything else the government should consider regarding the green steel scale in the Construction Leadership Council's (CLC) Five Client Carbon Commitments (5CCCs), or any points of the description, potential advantages, or disadvantages that you disagree with?

[Open text]

Note that to share any views on the CLC's green steel scale from an emissions reporting perspective, please refer to question 5.13 under option 3, as emissions calculation aligns with GSCC's system boundary. As the CLC does not specify verification requirements, to share any views on the green steel scale from a verification perspective, please refer to question 5.18 in the 'selecting a steel product classification' section below. To share views on reporting and verification in EPD format, please refer to Chapter 3.

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[144] Signatories include Lower Thames Crossing, Northumbrian Water Group, Heathrow, National Highways, Anglian Water, Sellafield, Transport for London, Scottish Water and the Environment Agency.

[145] For instance, the GSCC set thresholds separately for flat and long steel products, while LESS sets them for quality steel, and structural and reinforcing steel.

[146] CLC, 5 Client Carbon Commitments, Hints and tips

Option 5: U.S. Environmental Protection Agency's approach to setting limits for low embodied carbon steel

In 2022, under the U.S. Inflation Reduction Act (IRA), the Federal Highway Administration (FHWA) and the General Services Administration (GSA) received funding to purchase lower emissions materials, including steel. To guide this process, the U.S. Environmental Protection Agency (EPA) issued an interim determination outlining selection criteria for these materials. This approach is being explored as a market-based model that the UK Government could seek to replicate to classify steel products.

Unlike other approaches, the U.S. EPA did not use a sliding scale. Instead, it determined thresholds for multiple steel product categories based on global warming potential (GWP). These thresholds prioritise the best performing products within the top 20%, 40%, or 50% of industry benchmarks, considering similar materials and products in a project's location.[147]

For reporting, producers are required to provide product specific, third party verified EPDs based on Product Category Rules (PCRs) used to develop the thresholds.[148] Chapter 3 discusses embodied emissions reporting in EPD format further.

Potential advantages

- **Dynamic:** Thresholds reflect market availability of products based on GWP, helping users assess if a product's emissions are high or low compared to regional options
- **Enables like-for-like comparison:** Thresholds are set differently for multiple steel product categories,[149] considering differences in chemical compositions and production requirements. This enables more like-for-like comparisons
- **Comprehensiveness of environmental impacts (GHG emissions):** Unlike the other classification options, the system boundary for EPDs includes cradle to gate (A1 to A3) emissions, which captures downstream emissions, beyond crude steel or hot rolling

Potential disadvantages

- **Not directly aligned with net zero:** Thresholds are not explicitly linked to net zero goals, which could make it harder for buyers to set long term targets

5.15 Is there anything else the government should consider regarding the U.S. Environmental Protection Agency's (EPA) approach to setting limits for low embodied carbon steel, or any points of the description, potential advantages, or disadvantages that you disagree with?

[Open text]

To share any views on reporting and verification in EPD format, please refer to Chapter 3.

[147] The U.S. GSA applied the EPA's interim determination to set thresholds, see the U.S. GSA, Inflation Reduction Act low-embodied carbon material requirements

[148] These are estimated using data from a verified source such as an open source EPD database, industry-wide EPDs or a third party verified life cycle assessment (LCA) developed using the relevant PCR.

[149] This could include galvanised steel products and fabricated or unfabricated steel products.

Selecting a steel product classification

The following questions will inform the government's approach to steel product classifications, in particular which to recommend using in its product level green procurement policies.

5.16 Which of the following steel product classification option(s) is best suited to provide an accurate basis for classifying steel products as low carbon? Please explain your reasoning, especially if you are selecting multiple options or if you have a preference. [select all that apply]

Option 1: ResponsibleSteel Decarbonisation Progress Levels (DPLs)

Option 2: Low Emission Steel Standard (LESS)

Option 3: Global Steel Climate Council's (GSCC) product standard

Option 4: Green steel scale in the Construction Leadership Council's (CLC) Five Client Carbon Commitments (5CCCs)

Option 5: The U.S. Environmental Protection Agency's (EPA) approach to setting limits for low embodied carbon steel

Option 6: Other (please specify)

Option 7: None of the above

[Open text]

5.17 Which steel product classification option is best suited to encourage and support improved resource efficiency and a circular economy? Please explain your reasoning. [select all that apply]

Option 1: ResponsibleSteel Decarbonisation Progress Levels (DPLs)

Option 2: Low Emission Steel Standard (LESS)

Option 3: Global Steel Climate Council's (GSCC) product standard

Option 4: Green steel scale in the Construction Leadership Council's (CLC) Five Client Carbon Commitments (5CCCs)

Option 5: The U.S. Environmental Protection Agency's (EPA) approach to setting limits for low embodied carbon steel

Option 6: Other (please specify)

Option 7: None of the above

[Open text]

5.18 Are there any other considerations that the government should consider regarding the reporting and verification of product level embodied emissions data with respect to the use of steel product classifications? Please explain your reasoning.

[Open text]

Concrete product classifications

Concrete is the second most used material in the world after water, with approximately 14 billion cubic metres used in 2020.[150] Its strength, durability and versatility make it essential for constructing foundations, roads, bridges, buildings, and other structures. In 2021, the UK produced 24.8 million tonnes of concrete products and 52.7 million tonnes of ready mixed concrete.[151] See the technical annex for further information on concrete production and products.

The government has identified three concrete product classifications, developed by international and sector-led initiatives, that it considers to be viable options for use in UK policies such as green procurement. These options appear to be the most established approaches in the sector, a view informed by engagement with domestic and international concrete stakeholders. The assessment criteria have been used to consider each option's potential advantages and disadvantages, and alongside the results of this consultation, will be used to make final decisions on which option(s) should be recommended.

The options under consideration are:

- Option 1: The Lower Carbon Concrete Group's (LCCG) Market Benchmark[152]
- Option 2: Arup-Innovate UK's (UKRI) Universal Classification for embodied carbon of concrete[153]
- Option 3: The Global Cement and Concrete Association's (GCCA) Global Ratings adapted for the UK by the Mineral Products Association (MPA)[154]

To note, each concrete product classification option is designed to use EPDs to calculate, and classify, the embodied carbon of concrete products. To share any views on the use of EPDs within concrete product classifications, please refer to Chapter 3.

5.19 Are there any other concrete product classification options that the government has not identified and should consider as potentially suitable, in particular for use in green procurement policies? If so, please provide details.

[Open text]

[150] Global Cement and Concrete Association, 'Essential Concrete'; Arup, 2023, 'Embodied Carbon: Concrete'

[151] Mineral Products Association, Facts and Figures

[152] LCCG, 2024, 'LCCG Market Benchmark'; Please note, we have not considered the U.S. EPA's market-based approach as an option for concrete as it is broadly equivalent to the LCCG's existing product classification specifically developed for the UK market.

[153] Arup, June 2023, 'Embodied carbon classification scheme for concrete'

[154] MPA, February 2025, 'UK adaptation of Global Cement and Concrete Association (GCCA) Global Ratings for Low Carbon and Near Zero Concrete'

Key differences of concrete product classifications

The identified concrete product classifications vary in several key aspects, which could have implications for their effectiveness if adopted more widely. These features have been evaluated using the assessment criteria and in summary:

- **Dynamic vs fixed models:** As for steel, a dynamic product classification model allows thresholds to change based on factors that can change such as market availability, whereas a fixed approach maintains constant thresholds that align with long term net zero targets. Both dynamic and fixed models would in principle incentivise decarbonisation (criterion 1)

- **Lowest possible carbon rating:** As for steel, models that set more thresholds or bandings may better reflect and reward incremental improvements in decarbonisation (criterion 1). Arup-UKRI and the GCCA/MPA use alphabetical ratings (with A and AA for the lowest emission products). The LCCG use numerical ratings (1 to 5) and a 'market beating' category[155]

- **Specified strength classes:** Each model adjusts thresholds according to strength classes.[156] This is important as projects have diverse structural and durability requirements. Incorporating a range of strength classes enables comparison across a wider array of products (criterion 2)

- **Waste CO2e accounting:** Waste CO2e can be reported as 'gross' or 'net'. Net reporting deducts emissions from the co-processing of waste from the total (gross) value. This affects the comprehensiveness of environmental impact reporting (criterion 3)

[155] To avoid confusion between the Market Benchmark and other product classifications, the LCCG replaced the previous A, B, C, D, E rating system with a numerical system.

[156] Strength classes categorise concrete based on its compressive strength, measured in megapascals (MPa) after 28 days of curing. These classes ensure that the concrete used in construction meets the necessary performance requirements for safety and durability.

The table below summarises the key differences among the existing product classification options:

Product classification	Dynamic vs. fixed	Lowest possible carbon rating	Strength classes (product scope)	Waste CO2e accounting
Option 1: The LCCG's Market Benchmark	Dynamic (market based)	Market beating: lower carbon than data submitted	Currently 17 strength classes. C6/8 to C80/95 varies annually subject to industry data received	Gross emissions
Option 2: Arup-UKRI's Universal Classification for embodied carbon of concrete	Fixed	A: zero or negative embodied carbon	18 strength classes. C8/10 to C100/115	Net emissions (by default, aligned with EN 15804). Can report gross emissions by default if desired
Option 3: The GCCA's Global Ratings adapted for the UK by the MPA	Fixed	AA: embodied emissions from 17.7 to 65.3kgCO2e (depending on strength)[157]	15 strength classes. C6/8 to C100/115	Gross emissions

Table 4: Summary of key differences between concrete product classification options

5.20 Do you agree or disagree that the above is an accurate understanding of the key differences between concrete product classifications? Please explain your reasoning, and if any other differences should be considered.

[Yes, Strongly agree; Yes, Agree; Maybe/Undecided; No, Disagree; No, Strongly disagree]

[Open text]

Assessment of concrete product classification options

The following section sets out the government's initial assessment of concrete product classification options, examining how the models are designed and their potential advantages and disadvantages. Further information can be found in the technical annex.

Option 1: The Lower Carbon Concrete Group's (LCCG) Market Benchmark

The Lower Carbon Concrete Group's (LCCG)[158] Market Benchmark rates the embodied carbon of concrete by strength class.[159] It is updated annually to reflect market conditions,

[157] However, it would be possible to add an AAA rating for net negative concrete in the future.

[158]Formed in 2020 under the Green Construction Board, the UK LCCG brings together professionals from the concrete and cement industry, academia and engineering to reduce the carbon footprint of concrete.

[159] Focussing on the most common strength classes, which account for over 70% of the data used.

calculating the embodied carbon of concrete by market percentile.[160] It was updated in 2024 to adopt a numerical system that seeks to avoid confusion with alphabetical ratings used in other product classification models.

The model uses a 1 to 5 rating system, with each band representing 20% of the UK market. Each band is further split into four subdivisions (for instance, 1.1, 1.2). Products rated 1.1 fall within the top performing 5% (lowest emissions), while those rated 5.4 are in the bottom 5% (highest emissions). 'Market beating' refers to products with lower carbon emissions than the submitted market data, whereas 'outlier mixes' refer to those with higher emissions.

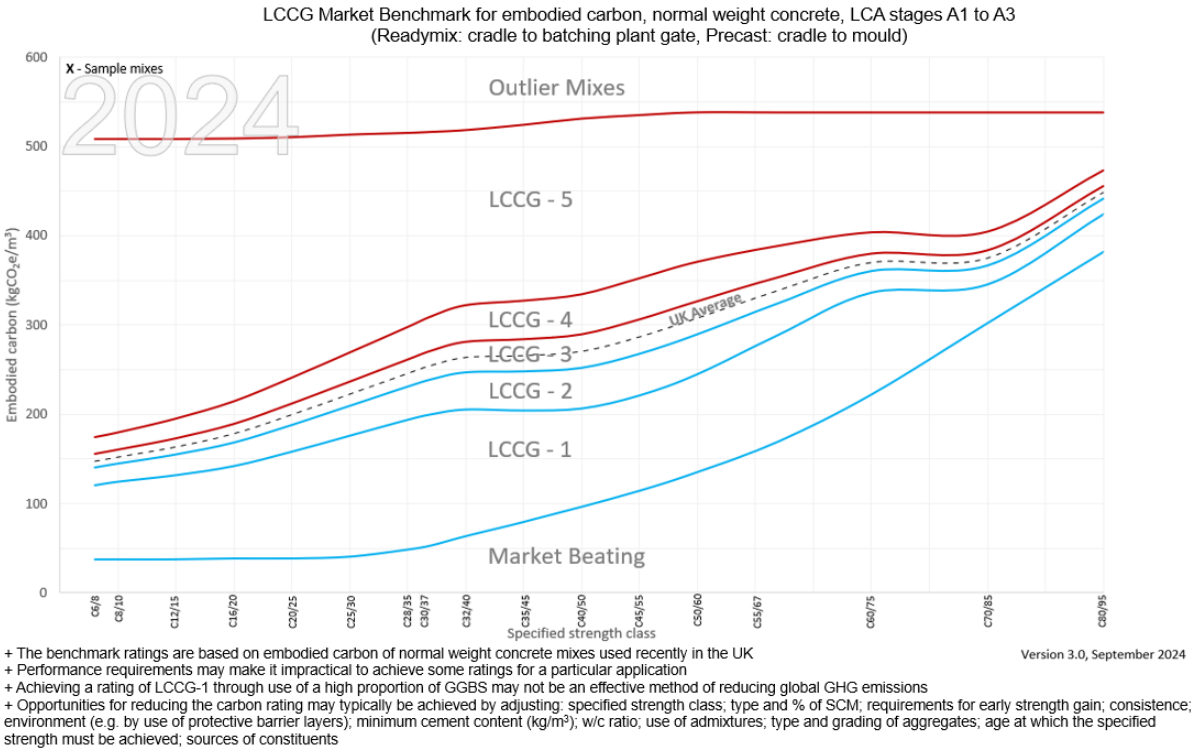

Figure 9: LCCG Market Benchmark for embodied carbon
Source: LCCG, September 2024, 'LCCG Market Benchmark'

Embodied carbon calculations for concrete mixes should be based on:

- LCA methodology: BS EN 15804+A2:2019
- Emissions scope: Cradle to gate (A1 to A3)
- Waste CO2e accounting: Gross emissions

The embodied carbon of concrete mixes should be calculated based on the embodied carbon of each constituent material. Where possible, values should be sourced from EPDs; however, it is acknowledged that EPDs may not be available for some constituents.[161]

[160] This update used data primarily received from the MPA, which covers 56% of the UK's 2023 ready-mixed concrete production.

[161] This is especially important for cementitious components, such as Portland cement and supplementary cementitious materials (SCMs) like ground granulated blast furnace slag (GGBS), calcined clay, and fly ash, as they typically account for most A1-A3 emissions in a concrete mix.

Potential advantages

- **Operational:** The product classification is already being used by ConcreteZero and several Infrastructure Client Group (ICG) members
- **Dynamic:** Annual updates reflect market conditions, helping users identify if a product's emissions are high or low compared to others in the market and creating competition amongst producers
- **Rewards continuous improvement:** The numerical rating system, divided into percentiles, encourages incremental decarbonisation by incentivising users to achieve progressively lower ratings
- **Wide product scope:** The 2024 update accommodates 17 different concrete strength classes, from C6/8 to C80/95, enabling assessment across a diverse range of products[162]

Potential disadvantage

- **Not directly aligned with net zero:** As the model compares the embodied emissions of concrete recently produced in the UK, the ratings are updated annually and, alone, may not provide a consistent baseline for long term planning

5.21 Is there anything else the government should consider regarding the Lower Carbon Concrete Group's (LCCG) Market Benchmark, or any points of the description, potential advantages, or disadvantages that you disagree with?

[Open text]

Option 2: Arup-Innovate UK's (UKRI) Universal Classification for embodied carbon of concrete

Arup was appointed by UK Research and Innovation (UKRI) to develop a concrete product classification model with fixed embodied carbon rating bands.[163] Bands A to G are set between embodied carbon (EC) reference curves at 20% intervals.[164] The baseline (EC100) was generated based on an analysis of the embodied carbon of normal weight concrete mixes for different strength classes made in the UK and elsewhere using CEM I (Portland cement) with no supplementary cementitious materials (SCMs). The reference curves reflect current and near future concrete availability but can be adjusted based on regional and market needs.[165] An 'A' rating corresponds to zero or negative embodied carbon.

[162] Excluding C90/105 and C100/115. C30/37 is accounted for by the continuous lines.

[163] Arup is a global firm of designers, engineers, planners, and technical experts committed to sustainable development. UKRI is the national funding agency investing in science and research in the UK. ConcreteZero and LCCG, 2024, 'Classification methodology for embodied carbon of concrete'

[164] The mean embodied carbon of concrete used in the UK in 2024 approximately corresponds to EC60.

[165] For regions with more carbon-intensive concrete, additional reference curves can be added above EC100, for instance at EC120, EC140 and so on. Similarly, as decarbonisation technologies advance, they can be extended downwards into the carbon neutral and negative 'A' rating classifications.

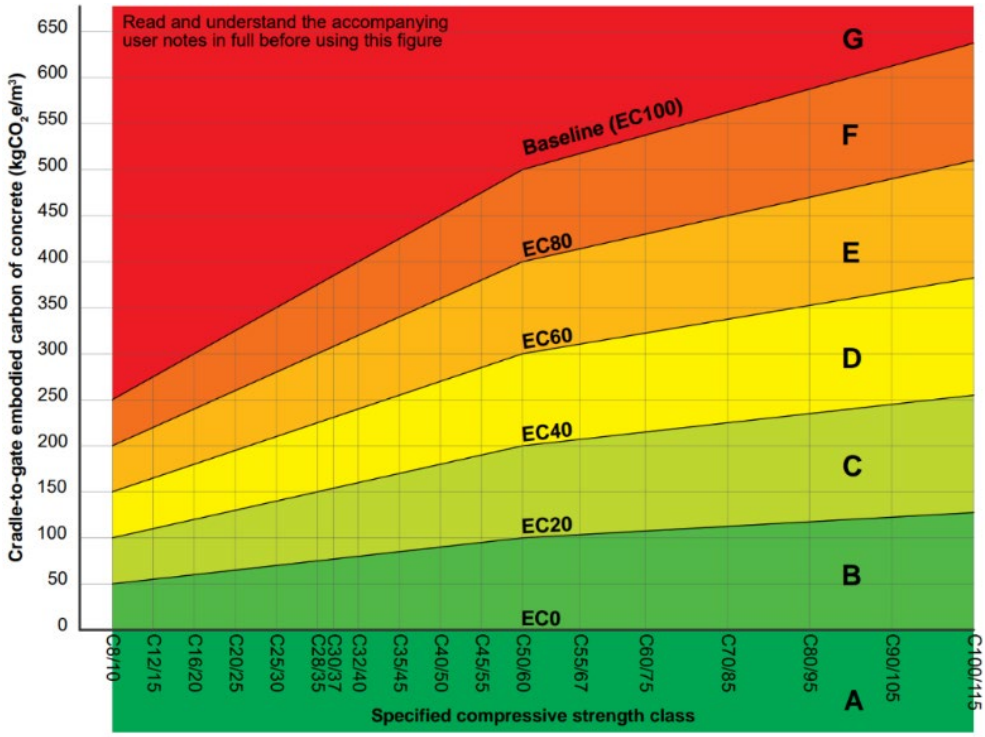

Figure 10: Arup-UKRI's embodied carbon classification scheme for normal weight concrete
Source: Arup, June 2023, 'Embodied carbon classification scheme for concrete'

Arup has published user notes outlining how the product classification should be used.[166] Embodied carbon calculations should be based on concrete EPDs created in accordance with:

- LCA methodology: BS EN 15804+A2:2019 and BS EN 16757:2022
- Emissions scope: Cradle to gate (A1 to A3)
- Waste CO2e accounting: The scheme aligns with BS EN 15804+A2:2019 which by default uses 'net' emissions values. However, the model is flexible and can adapt to any approach proposed by the UK government. Arup recommends using 'gross' values[167]

To note, Option 1 (the Market Benchmark) and Option 2 (the Universal Classification) have been combined by industry to illustrate the variation in the embodied carbon of commercially available concrete in the UK.[168] See the technical annex for further detail.

Potential advantages

- **Operational**: The model is used by the Construction Leadership Council (CLC) as part of their Five Client Carbon Commitments (5CCCs). Heidelberg Materials has integrated the model into its product promotion and reporting materials to highlight the embodied carbon of their concrete products. The model will feature in the 5th

[166] Arup, 2023, 'The Embodied Carbon Classification Scheme for Concrete'
[167] This would require an additional user note specifying that 'gross' values should be used. The position of the embodied carbon rating bands would remain the same.
[168] ResearchGate, 2023, 'Embodied carbon classification scheme for concrete'

Edition of the National Structural Concrete Specification and the next update of BS 8500

- **Fixed:** Constant thresholds enable buyers to plan long term decarbonisation strategies and can be referenced in guidance documents that are not regularly updated
- **Rewards continuous improvement:** The use of letter ratings (A to G) with progressively lower emission thresholds incentivises incremental decarbonisation as users strive to achieve increasingly lower ratings
- **Wide product scope:** The product classification accommodates 18 different concrete strength classes, from C8/10 to C100/115[169]
- **Futureproof**: Accounts for potential carbon neutral and carbon negative products if these become viable at scale

Potential disadvantage

- **Limited global comparability:** Comparing global ratings developed using different calculation methods requires caution, as the scheme does not currently address such variations. However, versions of the model tailored for the United States and Canada account for regional differences in concrete strength and embodied carbon measurement units. Similar variations of the scheme could be produced for other regions

5.22 Is there anything else the government should consider regarding Arup-UKRI's Universal Classification for embodied carbon of concrete, or any points of the description, potential advantages, or disadvantages that you disagree with?

[Open text]

Option 3: The Global Cement and Concrete Association's (GCCA) Global Ratings adapted for the UK by the Mineral Products Association (MPA)

This model is a collaboration between the GCCA and the MPA.[170]

In 2024, the GCCA published definitions for low carbon and near zero emission concrete.[171] Data from major cement producing countries was used to establish carbon footprint thresholds based on good practices in cement and concrete production. These thresholds were then combined and weighted to create the Global Reference Threshold (the top of band E). Band

[169] Excluding only C6/8 which is seldom used.

[170] The GCCA represents over 80% of the world's concrete industry outside China, working with global industry to drive sustainable and low carbon practices. The MPA is the UK trade association representing the aggregates, asphalt, cement, concrete, dimension stone, lime, mortar, and industrial sand industries.

[171] GCCA, 2024, 'GCCA Policy: Numerical Definitions for Low Carbon and Near Zero Emissions Concrete'

AA (near zero) was calculated according to the GCCA's Concrete Future Roadmap, which assumes near zero production practices by 2050.

Bands A to F represent equal increments between the global reference and near zero emission product thresholds, while band G accounts for all remaining higher emission concrete products. A visual representation of the GCCA's Global Ratings for Concrete can be found in the technical annex.[172]

While many countries report their net emissions (subtracting emissions related to the co-processing of waste), the UK adaptation adjusts bands to reflect gross emissions reporting in line with local EPD practices.[173]

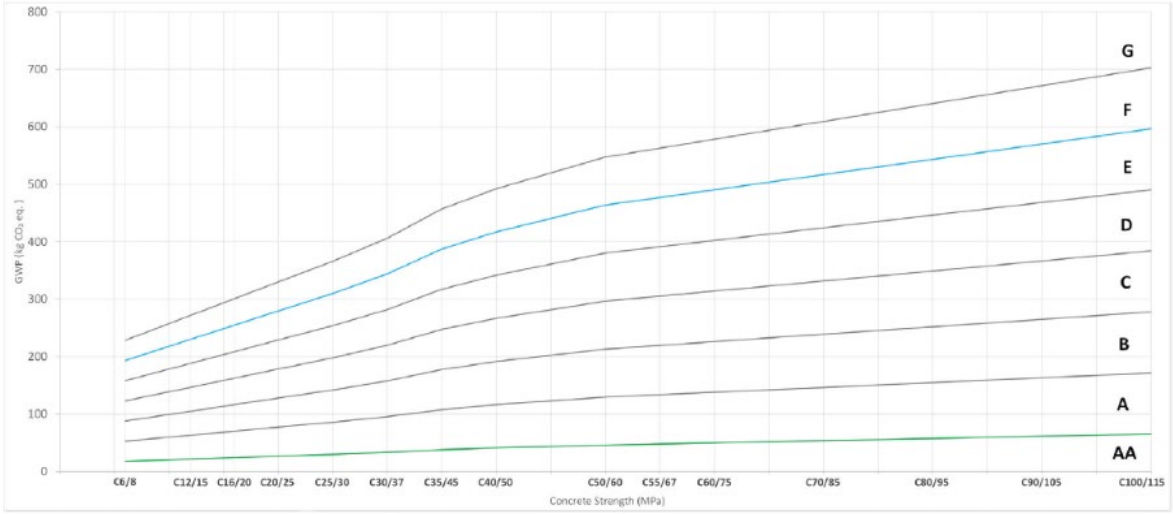

Figure 11: The UK adaptation of the Global Definitions for Low Carbon and Net Zero Emissions Concrete
Source: MPA, February 2025, 'UK adaptation of Global Cement and Concrete Association (GCCA) Global Ratings for Low Carbon and Near Zero Concrete'

Embodied carbon calculations should be based on concrete EPDs created in accordance with:

- LCA methodology: EN 15804+A2, PCR-001 – Cement and building lime (EN 16908) and PCR-003 – Concrete and concrete elements (EN 16757)
- Database: Ecoinvent
- Emissions scope: Cradle to gate (A1 to A3)
- Waste CO2e accounting: Gross emissions

Potential advantages

- **Operational:** Whilst this model is relatively new, the GCCA's Global Ratings were developed alongside multilateral initiatives such as the Industrial Deep Decarbonisation Initiative (IDDI) and the Climate Club to ensure interoperability.

[172] GCCA, 2025, 'GCCA Global Ratings for Concrete'

[173] In some countries, waste CO2e accounting follows ISO 21930 and EN 15804+A2, assigning impacts of waste fuels to the original product system per the 'polluter pays' principle.

Many GCCA members are expected to implement the product classification in their respective regions

- **Fixed and aligns with net zero:** Thresholds remain constant over time enabling buyers to plan and set long term decarbonisation targets. They can be referenced in guidance documents that are not regularly updated. Thresholds are based on a net zero end goal in line with the GCCA's 2050 Cement and Concrete Industry Roadmap[174]
- **Rewards continuous improvement:** The use of letter ratings (AA to G) with progressively lower emission thresholds incentivises incremental decarbonisation as users strive to achieve increasingly lower ratings
- **Wide product scope:** The product classification accommodates 15 different concrete strength classes, from C6/8 to C100/115[175]
- **Global comparison:** The GCCA's product classification is designed for use in all countries following necessary adjustments based on local EPD practices. By aligning with direction from the IDDI and Climate Club, this approach facilitates international comparison and provides a common framework for defining and measuring low carbon concrete

Potential disadvantage

- **May not be futureproof:** The model does not currently account for carbon negative concrete products as they are not yet available in the market. Currently the lowest classification available would be 'near zero'. However, the GCCA has indicated that carbon negative products could be recognised in the future, with countries introducing an AAA rating if they see fit

5.23 Is there anything else the government should consider regarding the GCCA's Global Ratings adapted for the UK by the MPA, or any points of the description, potential advantages, or disadvantages that you disagree with?

[Open text]

Selecting a concrete product classification

The following questions will inform the government's approach to concrete product classifications, in particular which to recommend using in its product level green procurement policies.

[174] .GCCA, 2022, 'GCCA 2050 Cement and Concrete Industry Roadmap for Net Zero Concrete' This roadmap outlines the steps industry needs to take to reduce carbon emissions, including adapting low carbon technologies, improving energy efficiency and increasing the use of alternative materials

[175] Excluding C8/10, C28/35, C32/40 and C45/55.

5.24 Which of the following concrete product classification option(s) is best suited to provide an accurate basis for classifying concrete products as low carbon? Please explain your reasoning, especially if you are selecting multiple options or if you have a preference. [select all that apply]

Option 1: The Lower Carbon Concrete Group's (LCCG) Market Benchmark

Option 2: Arup-Innovate UK's (UKRI) Universal Classification for embodied carbon of concrete

Option 3: The Global Cement and Concrete Association's (GCCA) Global Ratings adapted for the UK by the Mineral Products Association (MPA)

Option 4: Other (please specify)

Option 5: None of the above

[Open text]

5.25 Which concrete product classification option is best suited to encourage and support improved resource efficiency and a circular economy? Please explain your reasoning. [select all that apply]

Option 1: The Lower Carbon Concrete Group's (LCCG) Market Benchmark

Option 2: Arup-Innovate UK's (UKRI) Universal Classification for embodied carbon of concrete

Option 3: The Global Cement and Concrete Association's (GCCA) Global Ratings adapted for the UK by the Mineral Products Association (MPA)

Option 4: Other (please specify)

Option 5: None of the above

[Open text]

5.26 Do you think that a 'combined approach', such as the Universal Classification and Market Benchmark, could be utilised for procurement guidance? If so, how useful do you think it would be in practice? Please explain your reasoning.

[Very useful; Somewhat useful; I don't know / Neither useful nor not useful; Not very useful; Not useful at all]

[Open text]

Cement product classifications

Cement is a critical material in construction, used to produce concrete, mortar, and asphalt. Efforts to reduce its emissions include improving energy efficiency, adopting alternative fuels, and developing lower clinker content cement.

Existing cement product classifications

The government is not aware of any cement product classification model that has been designed specifically for the UK. The following existing models would need adaptation before they could be applied in the UK:

- **The International Energy Agency (IEA)** introduced a clinker sliding scale to define low emissions and near zero emissions cement in 2022. This approach sets progressively lower emissions thresholds based on the clinker to cement ratio, addressing clinker as the most emissions intensive component and the greatest technological challenge[176]
- **The Industrial Deep Decarbonisation Initiative (IDDI)** adopted the IEA's definitions as a baseline.[177] However, feedback on the use of a sliding scale has been mixed, with the GCCA stating that the sliding scale "disincentivises the use of supplementary cementitious materials (SCMs) to reduce cement emissions, thereby significantly limiting incentive for a key decarbonisation lever"[178]
- **The German Cement Producers' Association (Verein Deutscher Zementwerke, VDZ)** adapted the IEA's definitions to establish their own criteria for climate friendly cement.[179] Instead of a sliding scale, VDZ uses a fixed clinker to cement ratio of 0.7 to reflect typical German production. The GCCA supports VDZ's approach and recommends that countries adapt the IEA's definitions for low carbon and near zero cement using a static clinker to cement ratio based on national averages[180]
- **The U.S. Environmental Protection Agency (EPA)** chose to adopt a market-based approach, allocating funds to the Federal Highway Administration (FHWA) and the General Services Administration (GSA) to purchase cement products with embodied emissions in the lowest 20, 40 and 50% compared to similar products

5.27 Are there any other examples of cement product classifications that the government should consider? If so, please provide details.

[Open text]

Whether to pursue cement product classifications

After further research and input from stakeholders, the government does not initially propose to include a product classification for cement in future procurement guidance. Stakeholder discussions have highlighted the following issues regarding the inclusion of a cement classification:

- **It would not align with UK market practices:** In the UK, cement is typically sold as part of concrete rather than as a standalone product. Since concrete is directly

[176] IEA, 2022, 'Achieving Net Zero Heavy Industry Sectors in G7 Members'

[177] IDDI, 2023, 'Summary of progress and outlook'

[178] GCCA, 2024, 'Cement Definitions for Low Carbon and Near Zero Cement'

[179] Federal Ministry for Economic Affairs and Climate Action, 2024, 'Lead markets for climate-friendly basic materials'

[180] GCCA, 2024, 'Cement Definitions for Low Carbon and Near Zero Cement'

purchased and used in construction; targeting the low carbon product market policies at concrete products could better align with market practices and purchasing habits

- **Focussing on concrete would have a greater decarbonisation potential:** A product classification for concrete would account for the carbon footprint of the entire concrete mix, rather than just the cement component.[181] Focussing on concrete could also incentivise producers to optimise mix designs to reduce cement content
- **Avoiding unnecessary complexity:** Implementing product classifications for both cement and concrete could create unnecessary complexity. Since cement is primarily used in concrete, focussing on concrete could reduce administrative burden

However, using both cement and concrete product classifications could offer the advantage of:

- **Enhanced supply chain transparency:** Separate classifications could help cement buyers make greener decisions and encourage producers to reduce emissions. This might include adopting fuel switching techniques and improving production efficiency

The government will keep the potential for future introduction of a separate product classification for cement under review.

5.28 Do you agree or disagree with the government's proposed approach to not initially pursue a cement product classification? Please explain your reasoning, including examples of when it could be helpful to use a cement classification in addition to concrete.

[Yes, Strongly agree; Yes, Agree; Maybe/Undecided; No, Disagree; No, Strongly disagree]

[Open text]

Decarbonising cement and concrete further

To further decarbonise concrete, one approach is to reduce the proportion of cement, and therefore clinker, in it. This can be done by using alternative materials to cement called supplementary cementitious materials (SCMs). These materials can be mixed with water, aggregates (such as sand) and cement to create lower carbon concrete. Well established SCMs include coal derived fly ash and ground granulated blast furnace slag (GGBS). However, these materials are becoming less available in the UK and therefore it may be necessary to increase the use of emerging SCMs to further support the decarbonisation of concrete.[182]

5.29 In addition to product classifications, are there any policy approaches the government should take to support the scale up of supplementary cementitious materials (SCMs)? What changes may be required to ensure that some potentially promising SCMs are not disadvantaged?

[Open text]

[181] This includes elements such as SCMs, lower carbon aggregates, aggregates that sequester CO2, CO2 injections, and additives like graphene.

[182] UK Government, 2017, 'Cement manufacturing: use of fly ash and blast furnace slag'

Chapter 6: Green procurement for low carbon products

Green procurement is a crucial policy lever to drive market demand for low carbon products as public and private sector organisations buy substantial quantities of steel, cement, and concrete. In 2023, gross construction new work output[183] totalled £38.6bn and £100.4bn in the public and private sectors, respectively.[184] This substantial spending has the potential to shape the market and, if strategically directed, could increase demand for low carbon products, support innovation and the transition to a low carbon economy.

The central role of procurement was recognised at COP26, where the UK and India co-founded the Industrial Deep Decarbonisation Initiative (IDDI). This was followed by the IDDI's Green Procurement Pledge (GPP), to which the UK committed at COP28 and signalled its intention to meet up to Level 3. This was informed by responses to the previous consultation, which sought views on which pledge level would best support UK industry decarbonisation.

Many green procurement policies are already in place, both in the UK and internationally, but most do not focus on product level green procurement. Among those that do, approaches vary and could benefit from greater consistency. This chapter's proposals aim to address this issue as well as help deliver on the UK's commitment to the GPP.

This chapter will also explore opportunities to promote product level green procurement, including the benefits and challenges of implementation, and the role of existing government policies and industry-led initiatives. Views will be sought on proposals to develop best practice green procurement guidance for public and private organisations, including opportunities for expansion and integration with government policies.

6.1 If you are a procurer, does your organisation already practice any product level green procurement policies? If so, please provide details.

[Yes; No; Unsure]

[Open text]

6.2 If you are a procurer, do you already require embodied emissions data to be provided by potential suppliers? If so, please provide details.

[Always; Often; Sometimes; Rarely; Never]

[Open text]

[183] The total chargeable to customers for new building and civil engineering work in the relevant period excl. VAT.

[184] Office for National Statistics, 2024, 'Construction Statistics, Great Britain: 2023'

6.3 If you are a procurer, do you already use any examples of product classifications in your policies? If so, please provide details.

[Many; Several; Some; Few; None]

[Open text]

The Industrial Deep Decarbonisation Initiative (IDDI)

At COP28 the UK announced its commitment to the IDDI's Green Public Procurement (GPP) Pledge and signalled its intention to meet Levels 1, 2, and 3. This commitment was reaffirmed at COP29. The IDDI GPP Pledge outlines four levels of commitment to decarbonising public procurement:

Level 1: Starting no later than 2025, require disclosure of the embodied carbon in cement, concrete, and steel procured for public construction projects.

Level 2: Starting no later than 2030, conduct whole project life cycle assessments for public construction projects, and achieve net zero emissions in all public construction projects by 2050.

Level 3: Starting no later than 2030, require procurement of low emission cement/concrete, and steel in public construction projects, applying the highest ambition possible under national circumstances.

Level 4: Starting in 2030, require procurement of a share of cement and/or crude steel from near zero emission material production for signature projects.

Background to green procurement

Existing policies and initiatives

The government is already acting to encourage sustainable purchasing decisions in public procurement, primarily focussing on project level whole life carbon accounting. While existing standards promote decarbonisation throughout the procurement process, there is currently no centralised government standard to define, quantify, or communicate the intent to purchase low carbon products specifically.

Meanwhile, several industry-led initiatives have been established to standardise green procurement practices across organisations, promoting consistent definitions of low carbon products and encouraging supply chain decarbonisation. Examples include SteelZero, ConcreteZero, the First Movers Coalition, and the Construction Leadership Council (CLC). However, these initiatives vary in how they classify low carbon products and encourage organisations to set procurement commitments. This suggests that there is an opportunity to promote greater consistency across the supply chain, which could strengthen the overall signal to the market about the strength of demand for low carbon products.

Gaps and possible limitations

Through engagement with organisations across the supply chain, the government has identified several barriers in the current green procurement landscape that could limit the effectiveness of existing policies:

- **No central government guidance:** There is currently no clear government guidance on procuring products based on their embodied emissions. This could hinder the development of product level green procurement policies and lead to inconsistent approaches across different government departments, for example in terms of embodied emissions reporting requirements
- **Inconsistent definitions of 'low carbon':** Definitions of low carbon products (a form of product classification) being used by buyers vary, which can make understanding specifications, and thus the expectations for decarbonisation more challenging for suppliers
- **Inconsistent frameworks for setting commitments:** Commitments to buying low carbon (or phasing out high carbon) products differ between organisations. Greater consistency could provide clarity to suppliers about expectations and strength of future demand
- **Misunderstanding around market availability and cost implications:** The lowest carbon products may cost more and be less readily available. Some evidence on these points is available,[185] but a full evidence base and common understanding could help buyers confidently understand what would constitute a realistic and ambitious commitment

6.4 Do you agree or disagree with our overview of the barriers and possible limitations of the current green procurement landscape? Please explain your reasoning, including any others that the government should consider.

[Yes, Strongly agree; Yes, Agree; Maybe/Undecided; No, Disagree; No, Strongly disagree, I don't know]

[Open text]

Proposal to develop product level green procurement guidance

To help overcome the barriers outlined above, the government proposes developing best practice guidance for procuring low carbon steel, cement, and concrete products for construction projects. This guidance would be relevant to both public and private organisations and contain several different components. Some of these components could be implemented in the short-term using existing information, while others could be delivered in the longer term as they would require further evidence gathering, policy development, and stakeholder engagement.

[185] Such as the Low Carbon Concrete Group's Market Benchmark Product Classification, see Chapter 5.

By developing and promoting best practices for measuring embodied emissions and encouraging collaboration between procurers, suppliers, and manufacturers, the government aims to increase the amount and effectiveness of product level green procurement activity.

The guidance could be delivered in principal stages:

- **Stage 1, core guidance:** could generally encourage and provide options for buyers to implement product level green procurement policies. It could include instructions for setting commitments, collecting embodied emissions data, and engaging suppliers.
- **Stage 2, expanded guidance:** could draw on insights from this consultation, encouraging buyers to adopt best practice for product level carbon accounting (Chapter 2 and 3) and product classifications models (Chapter 5)
- **Stage 3, high ambition guidance:** could recommend specific products that should or should not be purchased based on their embodied emissions. It would require additional research, such as on market conditions, and thorough stakeholder engagement.

To ensure accessibility to both public and private organisations, it is proposed that the guidance would be published on GOV.UK and could be incorporated as a best practice standard within the Government Buying Standard (GBS),[186] specifically the Government Buying Standard for Construction Projects and Buildings. While other examples of existing procurement guidance are also being considered, the GBS provides both voluntary and minimum mandatory environmental and sustainability requirements for central government procurement. This approach would enable the introduction of voluntary best practice standards initially, with the possibility of adding mandatory standards to the GBS in the future.

6.5 Do you agree or disagree with our proposal to develop green procurement guidance for buying low carbon products? Please explain your reasoning, and if you disagree, please provide any suggestions for alternatives.

[Yes, Strongly agree; Yes, Agree; Maybe/Undecided; No, Disagree; No, Strongly disagree, I don't know]

[Open Text]

6.6 Do you agree or disagree with the proposal to introduce best practice, voluntary green procurement standards into the Government Buying Standards? Please explain your reasoning, including whether there are any other procurement guidance documents that should be considered.

[Yes, Strongly agree; Yes, Agree; Maybe/Undecided; No, Disagree; No, Strongly disagree, I don't know]

[Open text]

[186] Department for Environment, Food and Rural Affairs, 'Sustainable procurement: the Government Buying Standards (GBS)'

6.7 Would you agree or disagree with the prospect of the best practice guidance being made mandatory for government departments through the Government Buying Standards in future? Please explain your reasoning.

[Yes, Strongly agree; Yes, Agree; Maybe/Undecided; No, Disagree; No, Strongly disagree, I don't know]

[Open text]

Stage 1: Core guidance

The government would seek to publish stage 1 guidance in the short term, as this core guidance could outline the initial steps for buyers to incorporate product level embodied emissions considerations into their procurement practices. It could encourage organisations to engage with suppliers to assess availability, raise awareness of low carbon products and how to identify them and simplify the process of assessing the embodied emissions of products. Key components of this guidance could include:

- **Procurement policies and processes:** such as options for setting organisation-wide commitments or standards for purchasing low carbon products
- **Practical resources:** such as templates or case studies to support the implementation of policies and processes
- **Good practice advice:** such as guidance on coordinating with other buyers and engaging early with supply chains to meet upcoming data requirements

Core guidance could also encourage organisations to ask for the disclosure of embodied carbon in cement/concrete, in line with IDDI GPP Pledge Level 1 and supporting progress toward Level 2.

For public procurers, best practice guidance should align with and reflect broader government procurement and decarbonisation policies. The government plans to integrate this guidance into existing procurement frameworks to maximise awareness and adoption. For private procurers, guidance could include encouraging organisations to sign up to industry-led initiatives, such as the First Movers Coalition.

6.8 Do you agree or disagree with the above proposal to develop stage 1: core guidance as set out above? Please explain your reasoning.

[Yes, Strongly agree; Yes, Agree; Maybe/Undecided; No, Disagree; No, Strongly disagree, I don't know]

[Open Text]

Stage 2: Expanded guidance

Expanded guidance could draw on insights from this consultation by encouraging the adoption of preferred embodied emissions reporting methodologies (Chapter 3) and product classifications (Chapter 5). The resulting guidance would seek to standardise and strengthen practices for both manufacturers and buyers.

Procurement guidance could recommend the use of one or more product classifications to set specifications in contracts or set organisation-wide procurement commitments. It could also recommend best practice approaches for measuring, reporting, and verifying product level embodied emissions data. This could include requiring suppliers to provide information in a standard form, such as EPDs, calculated and verified according to a certain methodology.

6.9 Do you agree or disagree with the above proposal to develop stage 2: expanded guidance as set out above? Please explain your reasoning.

[Yes, Strongly agree; Yes, Agree; Maybe/Undecided; No, Disagree; No, Strongly disagree, I don't know]

[Open Text]

Stage 3: High ambition guidance

High ambition guidance could help buyers determine which products they should or should not buy, likely using product classifications. At a minimum, this guidance could establish categories with recommendations for purchasing low carbon products. It could also go further by specifying what products to avoid, or minimise buying (as demonstrated in figure 12):

- **Low carbon products (buy in the highest proportions possible):** Buyers would be strongly encouraged to buy these products in the greatest proportions possible. For example, a project could commit to procuring a minimum percentage, such as 10%, of its products from this category. This would support the delivery of IDDI GPP pledge Level 3 and possible introduction of deep decarbonisation technologies that could radically cut emissions intensity[187]
- **Medium carbon products (buy as a minimum):** Buyers could be encouraged to select these products when low carbon category products are either unavailable or too expensive. These products may be the most suitable in the early stages of transition to net zero, such as those implementing efficiency improvement measures
- **High carbon products (do not buy):** Buyers could be discouraged from buying these products, as they represent the most emissions intensive products. This could include products that are incompatible with net zero pathways or sectoral decarbonisations goals

[187] For example, the International Energy Agency (IEA) have estimated that the application of carbon capture in steel manufacturing could result in 60% to 85% reductions. https://www.iea.org/reports/achieving-net-zero-heavy-industry-sectors-in-g7-members (p.115)

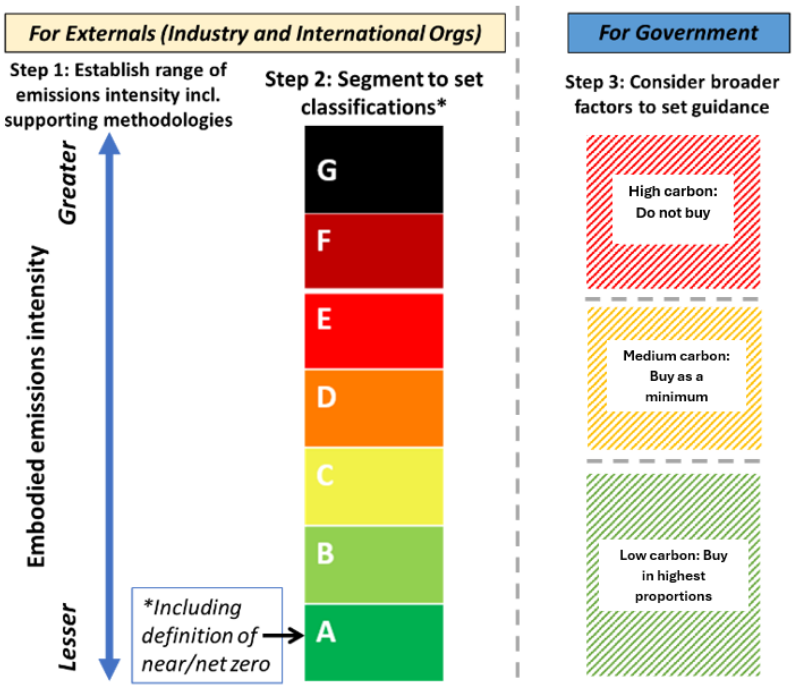

Figure 12: Diagram illustrating the relationship between embodied emissions data, product classifications and proposed buying categories.

Structuring guidance around these three categories could send a clear long term market signal to both manufacturers and buyers about what would constitute 'low carbon' procurement, allowing for some flexibility and enable a gradual approach through the 'medium carbon' category whilst phasing out products within the 'high carbon' category.

In the future, subject to further work and consideration, this guidance could form the basis of mandatory procurement requirements for at least some public organisations, such as central government departments. For private procurers, the government would continue to collaborate with industry led initiatives and would explore how to best encourage alignment with or adoption of this guidance.

6.10 Do you agree or disagree with our proposal to develop stage 3 'high ambition guidance' as described above? Please explain your reasoning.

[Yes, Strongly agree; Yes, Agree; Maybe/Undecided; No, Disagree; No, Strongly disagree, I don't know]

[Open text]

Evidence inputs for guidance

To develop effective guidance for procuring low carbon products, particularly in support of the 'high ambition' guidance option, the government requires a robust and varied evidence base which could be updated to reflect market changes. The following four sources of evidence are under consideration:

- **Net zero roadmaps and trajectories:** Ensuring the guidance aligns with and supports progress towards established decarbonisation targets, such as net zero by 2050 and intermediate carbon budgets. Such alignment would help ensure that the guidance is

appropriately ambitious and help anticipate how it will need to change in future to remain so.

- **Technological decarbonisation potential:** Assessing the availability and development stages of technologies to understand when they will be available and what impact they are likely to have on production related emissions. It may be particularly important to understand and anticipate the implementation of deep decarbonisation technologies.
- **Cost implications:** Evaluating the economic feasibility of proposed policies by factoring in the pricing trends of low carbon materials. This encourages procurement of lower carbon products, even if they are more expensive in the short to medium term.
- **Market availability:** Reviewing the fulfilment of procurement commitments and monitoring market availability of low carbon products. Guidance could adapt as the market evolves, ensuring demand is directed toward suppliers leading in ambitious decarbonisation efforts.

The evidence collection and assessment process will need to be continuous, even after publication, with regular updates to reflect emerging market trends. A systematic approach for reviewing and refreshing the underlying evidence would be essential to ensure that the guidance stays up to date and remains effective and relevant

6.11 Do you agree or disagree with the proposed types of evidence outlined, or are there other sources of evidence that should be considered? Please provide details and explain your reasoning.

[Yes, Strongly agree; Yes, Agree; Maybe/Undecided; No, Disagree; No, Strongly disagree, I don't know]

[Open text]

6.12 What would be the cost implications of procuring low carbon products? Please provide details, including how this might change over time.

[Definitely yes; Probably yes; Maybe/Undecided; Probably no; Definitely no, I don't know]

[Open text]

Stakeholder engagement

The government believes that collaboration with buyers and suppliers from both public and private sectors is essential to ensure any guidance developed is practicable, widely adopted, and reflects a shared consensus. To achieve this, the government could either implement a more informal programme of working groups, a more formal governance structure such as a steering group, or a combination of the two.

The composition of any groups would seek to represent manufacturers, suppliers, buyers, and any other relevant parties, such as from academia. This would bring together stakeholders across in scope sectors to share positions, data and recommendations to maintain an evidence base which accurately reflects emerging trends across the supply chain.

Further considerations

Pathway to possible mandatory public procurement policies

Initial voluntary guidance could provide an opportunity to develop case studies, capture lessons learned, and ensure successful deployment of the guidance by participating organisations. This could lay the foundation for future mandatory public procurement policies, subject to further consideration. Although not included in the initial delivery of green procurement guidance, elements such as emissions reporting, product classifications, and recommendations on which products to buy or not buy could inform future mandatory policies.

Resource efficiency and other considerations

Progress towards net zero will likely require the adoption of resource efficiency alongside other measures. Resource efficiency is defined as optimising material use to meet consumption needs with less material input, and it encourages circular economy practices, such as maximising recycled, reused, or remanufactured content. It is estimated that by 2035, these measures could enable UK industry to reduce emissions by 2.5MtCO2e annually.[188]

While the construction sector has made significant progress in material recovery, much of the recovered material is downgraded (e.g. turned into rubble). Greater efforts are required to transition towards a circular economy where materials remain in use for as long as possible, and materials are reused or repurposed to prevent waste. Circular economy principles could be integrated into the green procurement guidance, alongside recommendations for procuring low carbon products. For example, by encouraging that reused materials be prioritised.

Advance market commitments could further support this transition by driving investment in new climate technologies that are not yet commercially available. These agreements create markets for new technologies based on pre-agreed technical specifications, helping to scale solutions that could significantly reduce emissions. Innovate UK, for instance, is currently exploring Advance Market Commitments for cement and concrete products.

6.13 Do you agree or disagree with including circular economy principles alongside advice in the GBS on procuring low carbon products? Please explain your reasoning.

[Yes, Strongly agree; Yes, Agree; Maybe/Undecided; No, Disagree; No, Strongly disagree, I don't know]

[Open text]

6.14 Are there other public procurement guidance documents where circular economy principles should be included? Please explain your reasoning.

[Multiple choice: Construction Playbook, Government Buying Standards, Procurement Policy Notes, Construction Product Regulations, Other, please specify]

[Open text]

[188] Department for Energy Security and Net Zero, 2021, 'Net Zero Strategy: Build Back Greener'

Chapter 7: Longer term policy options

This chapter seeks views on possible longer-term options the government could consider to further develop the market for low carbon products. These options primarily focus on the development of product ecolabelling policies and mandatory product standards (MPS), which were also explored in the previous consultation. This chapter also considers the potential to expand the low carbon product market policies outlined in this consultation to other sectors beyond steel, cement, and concrete, and invites views on whether any other forms of policy intervention should be considered in the future.

Product ecolabelling

In addition to embodied emissions reporting, product classifications, and green procurement policies, product ecolabelling could present an opportunity to promote low carbon products. Ecolabels can help businesses clearly communicate a product's environmental impact to buyers, encouraging lower carbon purchasing choices. Without such labels, there is a risk that this information may go unnoticed, untrusted, or not effectively factored into decision-making. Many forms of ecolabel already exist for steel, cement, and concrete, so the government is exploring whether there are opportunities to better utilise these to help grow demand, or whether anything new and additional might be needed.

The previous consultation received mixed responses on how the government should approach product ecolabelling. Concerns included the perceived limited impact of labels, the already widespread use of Environmental Product Declarations (EPDs) as ecolabels, and whether simple labels would be suitable for complex business-to-business transactions. Given these uncertainties and the longer-term delivery of this work, this section will focus on high level objectives and options to guide next steps of policy development.

As this policy is still in its exploratory phase, the concept of 'ecolabelling' is considered broadly to include any means of conveying information about a product's environmental impact. While the primary focus for this consultation is embodied emissions, ecolabels could help communicate a broad spectrum of environmental information that could support other government policies such as improving circularity and reducing waste.

This section seeks views on the objectives that would inform any future work on ecolabelling, the audiences and use cases that ecolabels could target, and the high level approaches the government's work could take (to use existing or develop new forms of ecolabel). This section also seeks views specifically on whether the EU's work on Digital Product Passports creates opportunities or challenges for UK businesses.

Objectives and possible use cases

Should the government progress product ecolabelling for industrial products, it would aim to achieve the following objectives, which have been informed by stakeholder engagement and feedback from previous publications:

- Enhance the transparency of environmental information
- Improve the credibility of low carbon claims

- Increase the visibility of low carbon materials in products
- Increase the appeal of low carbon products to consumers.

Any ecolabelling initiatives for industrial products would also need to complement existing ecolabelling policies for other product types.[189]

The government also believes that ecolabels could be helpful in several use cases. Pursuing multiple forms of ecolabels in parallel could help engage a wider range of potential users with different needs throughout the supply chain to either produce or understand environmental sustainability claims. Potential users could include producers seeking to communicate environmental claims about their products, buyers of intermediate products seeking to decarbonise their supply chains and buyers of end products who want to make lower carbon purchases.

Ecolabels could take various forms, such as QR codes or other forms of links, providing access to detailed embodied emissions data. Where ecolabels involve unique identifiers, there may be opportunities to improve the traceability of raw materials and intermediate products across supply chains and in complex end products. Ecolabels can represent general or specific claims about the environmental sustainability of a product. If these claims are certified by a trusted organisation (such as the government), it could improve credibility, combat greenwashing and therefore build consumer confidence. This form of ecolabel could enable end consumers to identify the use of low carbon intermediate materials in complex end products, such as the use of low carbon steel in a car or white good.

7.1 Is there anything else that the government should consider in terms of its objectives, audiences, and possible use cases for any future work on product ecolabelling? If so, please provide details.

[Open text]

Options for future work on ecolabels

The government is currently considering two approaches to achieve its objectives for ecolabelling. These approaches are not mutually exclusive and could be pursued in parallel.

Approach A: Utilise existing ecolabels. This approach would focus on expanding the use of existing labels and/or collaborating with their owners to enhance effectiveness. It could include promoting the greater adoption of EPDs or existing product classification labels (such as ResponsibleSteel and LESS). This could also involve supporting the use of Digital Product Passports (DPPs)[190] to improve traceability and help facilitate cross-border trade of intermediate products, ensuring alignment with relevant EU plans (see below).

[189] Such as energy-related products like white goods, boilers and other household appliances https://www.gov.uk/guidance/create-an-energy-label

[190] A digital identity card that aims to provide easily accessible digital information, such as for users of products, supply chain actors, and regulators. This can include embodied emissions data, other environmental information, and links to EPDs.

Approach B: Develop new forms of ecolabels. Any new label could be developed in collaboration with prospective users to ensure it adds value and is fit for purpose. This could involve developing a free-to-use product classification label that is not part of a wider certification scheme (such as ResponsibleSteel and LESS). Alternatively, a 'made with low carbon materials' label could help manufacturers of end-products in marketing the low carbon intermediate products they use to appeal to end-consumers of products such as white goods.

7.2 Do you agree or disagree that either approaches A or B, to (A) utilise existing ecolabels, or (B) develop new forms of ecolabel could be beneficial? Please explain your reasoning and specify if there are any options within these approaches that the government should consider.

Option 1: Approach A only

Option 2: Approach B only

Option 3: Both approaches A and B

Option 4: Neither approach

[Open text]

Upcoming European Union regulations for Digital Product Passports (DPPs)

As part of its broader approach to ecolabelling, the government will need to consider the EU's plans to implement DPPs for a large range of products by 2027 as this will set an important precedent and directly impact many UK businesses. The EU are introducing DPPs through updates to regulations including the Eco-design for Sustainable Products Regulation (ESPR)[191] and the updated EU Construction Products Regulation (CPR).[192] The ESPR includes iron and steel as a priority product group. Cement will also require DPPs under the CPR.[193]

The information that the DPPs contain will depend on the specific product in question and will be decided for each product group by the European Commission. However, it is understood that DPPs are likely to include information for carbon footprints and upstream scope 3 emissions.[194] For in-scope products, a DPP will be required to export to the EU. Conversely, any products imported from the EU will also have a DPP.[195]

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[191] The ESPR extends the scope of the previous Ecodesign Directive from only energy-related products to virtually all physical products. Only a few exemptions apply, for example, for food and feed, and medicinal products. https://commission.europa.eu/energy-climate-change-environment/standards-tools-and-labels/products-labelling-rules-and-requirements/ecodesign-sustainable-products-regulation_en#documents-and-links

[192] The CPR sets harmonised rules for the marketing of construction products in the EU, https://single-market-economy.ec.europa.eu/sectors/construction/construction-products-regulation-cpr_en

[193] With the option to bring cement under ESPR if the decarbonisation in this sector accelerates, as the ESPR is considered to be a stronger regulation.

[194] This information can include product's technical performance, materials and their origins, repair activities, recycling capabilities, and lifecycle environmental impacts.

[195] In 2023, c.5.6 million tonnes of steel was produced in the UK and c.2.75 million tonnes was exported to the EU, representing c.45% of production. Also in 2023, the total demand for steel in the UK was c.7.6 million tonnes, and c.3.5 million were imported from the EU, representing c.46% of demand.

As noted in Chapter 4, the EU are exploring proposals for an IT system to underpin its approach to DPPs. As more details emerge, the government will consider the implications for its own approach to ecolabelling and embodied emissions reporting.

7.3 Do you believe that the EU's development of Digital Product Passports (DPPs) for steel and cement will create opportunities or challenges for UK businesses and the government's objectives for ecolabelling? Please explain your reasoning and provide details of any specific opportunities or challenges that the government should consider.

[Presents many challenges; presents some challenges; Unsure / Presents neither challenges nor opportunities; Presents some opportunities, Presents many opportunities]

[Open text]

Mandatory product standards (MPS)

Mandatory product standards (MPS) would be a regulation that sets upper limits on the embodied emissions of certain industrial products produced in or imported into the UK. MPS were explored in the previous consultation and in that government response, the government committed to further explore the potential role of MPS.

The decision not to commit to implementing MPS for any specific sector was informed by concerns raised in the previous consultation, which included the risk of unintended consequences, such as product substitution, supply chains distortions, and carbon leakage in export markets.

Since the previous consultation, the government has explored whether introducing and expanding product level green procurement policies (Chapter 6) could achieve similar desired results of growing the market for low carbon industrial products while reducing the share of higher carbon alternatives. While MPS is not being developed for implementation in the short term, the government remains open to exploring its potential future role. Many of the policies discussed in this consultation, such as more standardised embodied emissions reporting, would support any future implementation of MPS.

7.4 Should the government consider any additional information or developments since the previous consultation as the government continues to explore whether there is a role for mandatory product standards (MPS) from the late 2020s?

[Open text]

Future exploration of sector scope expansion

The government is committed to implementing the low carbon product market policies for the initial sectors of steel, cement, and concrete. Following implementation, options for expanding these policies sector scope will be explored. Three broad strategic approaches could guide this future expansion:

- **Approach 1: Other construction related sectors and products**. Examples include asphalt, ceramics, glass, and plastics
- **Approach 2: The next largest emitting industrial sectors**. For instance, chemicals
- **Approach 3: Sectors that would enable expansion to downstream products**. Examples include aluminium and plastics

Recognising the complexities involved, the government would begin by investigating the current use of product level emissions reporting in these sectors. This includes assessing the prevalence of EPDs and the existence of product classifications to distinguish between higher and lower carbon products.

Approach 1: Other construction related sectors

The government could opt to prioritise other industrial materials used in construction, such as asphalt, ceramics, glass, and plastics. This approach could unlock additional opportunities for decarbonising the construction sector by systematically addressing input materials.

The implementation of the proposed procurement policies outlined in Chapter 6 could further support a favourable environment for low carbon procurement within the construction sector. This could mean that buyers in this sector would be more prepared to incorporate low carbon materials into their practices. Additionally, targeting construction aligns with government policies aimed at improving resource efficiency and decarbonising off-road machinery.

Approach 2: The next largest emitting industrial sector

Another future focus could be on major emitting sectors, like the chemical sector. [196] Chemicals consist of four diverse sub-sectors:

- **Petrochemicals**: including ethylene and propylene. These are used for plastics, resins, and synthetic fibres.
- **Basic inorganics:** including ammonia, sulfuric acid, and chlorine. These are used in agriculture, water treatment, and industrial processes.
- **Plastics and other polymers:** such as for use in packaging, construction, and automotive

[196] In 2022 the chemicals sector emitted 7.8 MtCO2e, or 11% of UK industrial emissions. Table 8.9, UK greenhouse gas emissions by Standard Industrial Classification (SIC) 1990-2022 published 27 June 2024. While refining emissions are significant, demand for petroleum products may be influenced by other policies targeting transport and heating emissions.

- **Fine and specialty chemicals:** such as flavours, fragrances, and active pharmaceutical ingredients (APIs)

Focussing on chemicals could help reduce upstream emissions across various industries and promote innovation for sustainable carbon sources in the chemical sector.

Approach 3: Sectors enabling expansion to downstream products

The initial in-scope sectors, particularly steel, are widely used in consumer-facing, downstream products such as white goods. The government could focus on a particular end product and aim to establish a framework for classifying that it was, for example, a 'low carbon washing machine'. However, this may not be possible without establishing the embodied emissions of all other materials used in the product. Depending on the end product, the government could first prioritise expanding into sectors where embodied emissions data is less readily available.

7.5 Which of the proposed strategic approaches to expansion do you prefer? Please explain your reasoning.

Option 1: Other Construction-Related Sectors
Option 2: The next largest emitting sectors
Option 3: Sectors which would enable expansion to downstream products (please specify any suitable downstream products)

[Open text]

7.6 Regardless of overall strategic approach, please note any specific sectors you think should be a priority in any future expansion of low carbon product market policies. Please explain your reasoning. [select all that apply]

Option 1: Aluminium
Option 2: Asphalt
Option 3: Ceramics
Option 4: Chemicals
Option 5: Food and Drink
Option 6: Glass
Option 7: Other non-ferrous metals
Option 8: Non-metallic minerals
Option 9: Paper and Pulp
Option 10: Plastics
Option 11: Other (please specify)

[Open text]

Other low carbon product market policy options

In addition to the policies previously discussed, there are further opportunities to expand the low carbon product market policies and further grow the market for low carbon products. This section sets out some very initial ideas the government could start exploring for the long term.

In March 2025, the International Energy Agency (IEA) published a "Policy Toolbox for Industrial Decarbonisation" report, which outlined various strategies for fostering a market for low carbon products.[197] This included (alongside other policy options):

- **Collaborative procurements and buyers' alliances**: Groups of producers could form alliances to purchase specified quantities of low carbon materials. Government could support these alliances by facilitating their creation, developing standardised contracts with legal protections, and even participating as a public sector buyer.
- **Near-zero emission material mandates or quotas, and minimum content regulations:** Regulations could be applied to producers, requiring them to sell increasing proportions of near zero emissions materials. Alternatively, mandates could target buyers in key demand sectors, such as automotive or construction, requiring them to purchase growing shares of low carbon products.
- **Embodied carbon limits on end products:** These policies consider emissions resulting from the production of finished goods (such as white goods or buildings) and introduce limits through regulations.[198] Similar building-level embodied emissions policies have been implemented in Canada and France.[199]

7.7 Should the government explore any of the long-term policies suggested in this section? Please explain your reasoning. [select all that apply]

Option 1: Collaborative procurements and buyers' alliances

Option 2: Near-zero emission material mandates or quotas, and minimum content regulations

Option 3: Embodied carbon limits on end products

Option 4: Other (please specify)

Option 5: None of the above

[Open text]

[197] https://www.iea.org/reports/policy-toolbox-for-industrial-decarbonisation

[198] For instance, maximum quantity of embodied carbon per unit of floor area in a building.

[199] https://www.ecologie.gouv.fr/politiques-publiques/reglementation-environnementale-re2020

Annex A: Glossary of terms, acronyms, and initialisms

Advanced Market Commitments (AMCs)	Advance market commitments (AMCs) are agreements by procurers to create a market for innovative products or services that aren't yet commercially developed, based on pre-agreed technical specifications. As such, AMCs incentivise research and development by promising to purchase its outputs, promoting innovation through a pull mechanism rather than traditional push mechanisms like grants.
Alternative fuels	Alternative fuels to traditional fossil fuels can be used in production. In this context alternative fuels refers to those that generate emissions such as biomass or waste plastic.
Arup	Arup is a global firm of designers, engineers, planners, and technical experts committed to sustainable development.
Assessment criteria	In this context, this refers to specified objectives our policies or proposals can be measured against.
British Standards Institute (BSI)	BSI has a Memorandum of Understanding with the UK Government, which establishes the position of BSI as the recognised UK National Standards Body (by geographic designation, there are international, regional, and national standards bodies (the latter often referred to as NSBs).
Buyers	Individuals or organisations that purchase industrial products, such as those in the construction or automotive sectors.
By-product	A product produced incidentally as a secondary result of the production of the main product. By-products are typically lower in both volume and value relative to co-products.
Carbon accounting	In this context, carbon accounting refers to the Co2e emissions associated with a good, usually but not always it’s production.
Carbon Border Adjustment Mechanism (CBAM)	Carbon Border Adjustment Mechanism (CBAM) is a policy to put a fair price on the carbon emitted during the production of carbon intensive goods that are entering a jurisdiction with an Emission Trading Scheme that puts a price on GHGs emitted in domestic production. There is an **EU CBAM**. A **UK CBAM** is intended in place by 2027.
Carbon price	This refers to placing a monetary cost on a unit of Co2 or Co2e emissions.
Carbon dioxide equivalent (CO2e or CO2eq or CO2-e or CO2-eq)	The mass of **CO2** that would warm the earth as much as the mass of that gas. Thus, it provides a common scale for measuring the climate effects of different gases. It is calculated as **GWP** times mass of the other gas.

Carbon leakage	The displacement of production, and associated greenhouse gas emissions, in ways that would not have happened if the pricing (or regulation) of emissions across jurisdictions was implemented in an equivalent way.
Cement	Cement is a fine, powdery substance made from a mixture of primary raw materials such as limestone and clay. These materials are quarried using heavy machinery or blasting, then broken down into smaller pieces at cement plants. The processed materials are then heated to high temperatures in kilns and ground into a fine powder. Once combined with gypsum, this becomes Portland cement. When mixed with water, cement forms a paste that hardens over time and acts as a binder in concrete and mortar.
Chain of custody	Chain of custody is a method in which inputs and outputs and associated information are transferred, monitored and controlled as they move through each step in the relevant supply chain.
Circular economy	An approach to managing resources that involves products and materials being kept in use for as long as possible, extracting maximum value from them. It means products and materials are reused, repaired, remanufactured, recycled or regenerated whenever possible and appropriate.
Concrete	Concrete is a composite material made of cement, water, and aggregates like sand, gravel, or crushed stone. The cement binds the aggregates together, and when mixed with water, forms a hard, stone-like material.
Construction Leadership Council (CLC)	The CLC works with the construction industry and government to improve the industry's productivity, skills, safety, and sustainability. They launched the **'Five Client Carbon Commitments' (5CCCs)** in April 2024 to encourage UK construction clients to drive demand for low carbon solutions.
Consumption emissions	Emissions that are associated with consumption spending on goods and services, wherever in the world these emissions arise along the supply chain, and those which are directly generated by households through private motoring and burning fuel to heat homes.
Conference of the Parties (COP)	COP refers to the decision-making body of the **United Nations Framework Convention on Climate Change (UNFCCC).** In November 2021, the UK hosted the 26th annual session of the Conference of the Parties to the Convention, or '**COP26**', in Glasgow.
Co-product	A product produced together with another product during the same industrial process or product system.

Decarbonisation	A process of reducing the greenhouse gases we release into the atmosphere.
Declared unit	This metric measures CO2e or **GWP** per quantity, typically by mass or volume (e.g. 'CO2e per kg of steel' or 'CO2e per m3 of cement').
Default values (DV)	A form of secondary data that substitute embodied emissions for products or input goods based on averages instead of the actual result based on primary data for that particular product. For example, crude steel could have a 'default value' of 400kg of **CO2e** per tonne based on a global average.
Discovery	Discovery is a pre-delivery project phase that aligns stakeholders on vision, objectives and goals, outlines the solution and defines foundations for successful delivery.
Downstream products	Finished goods derived from raw materials through processing and distribution, ultimately reaching the end consumer.
Embodied emissions	The sum of all the emissions produced in the manufacture, use and end of life stages of a product, outside of operational emissions. This includes (but is not limited to) emissions from the extraction and transportation of raw materials, and the manufacturing processes used to create the final product.
Emission conversion factor	An emission conversion factor is a coefficient (conversion factor) that describes the rate at which a given activity releases **greenhouse gases (GHGs)** into the atmosphere.
Emissions Trading Scheme (ETS)	A 'cap and trade' emissions pricing policy. There are ETSs in different jurisdictions including the **EU ETS** and **UK ETS**. The UK ETS provides a long-term carbon price signal for UK heavy industry, aviation and power sectors to incentivise sector decarbonisation and support the UK to meet its legally binding carbon reduction targets.
End consumer	The end-user or consumer of a product that is not sold on or used in the manufacture of another product.
End-consumer product (or 'finished' product)	A product which, once purchased, is consumed or used directly by the purchaser and is not sold on or used in the manufacture of another product.
Energy efficiency	When something performs better using the same amount of energy or delivers the same performance for less. The principle of energy efficiency can be applied to many things: buildings, products, appliances, manufacturing processes, to name a few.
Environmental impacts	Changes in the natural or built environment resulting from an activity, which can have adverse or beneficial effects on the air, land, water, fish, wildlife, or the ecosystem.
Environmental Product Declaration (EPD)	An independently verified report that communicates what a product is made of and how it impacts the environment across its entire life cycle.

EPD generator	A programme that simplifies the generation of an **EPD**.
European Standards (EN)	Technical standards which have been ratified by one of the three **European Standards Organizations (ESO)**: **European Committee for Standardization (CEN)**, **European Committee for Electrotechnical Standardization (CENELEC)**, or **European Telecommunications Standards Institute (ETSI)**.
Functional unit	This metric quantifies emissions based on the product's performance in its end use, including its expected lifespan (e.g. 'x amount of CO2e in a 1-tonne steel beam, S grade designed to last for 80 years in a building' or 'x amount of **CO2e** in 1 m3 of concrete with a strength class of C20/80 to be used for 60 years in a building' are functional units.
German Federal Ministry for Economic Affairs and Climate Action (BMWK)	The BMWK is a cabinet level ministry of the Federal Republic of Germany.
German Steel Association (WV Stahl)	WV Stahl represents Germany's steel industry, that aims to achieve climate neutrality by 2045. They published the **Low Emission Steel Standard (LESS)** rulebook which is a steel product classification model. This was based on a stakeholder process organised by the **German Federal Ministry for Economic Affairs and Climate Action (BMWK)**, titled 'Lead markets for climate-friendly basic materials'.
Global Cement and Concrete Association (GCCA)	The GCCA works with the global cement and concrete industry to drive sustainable and low carbon practices. Its members represent 80% of global cement production outside of China and includes several large Chinese manufacturers.
Global Steel Climate Council (GSCC)	GSCC is a non-profit association dedicated to advancing climate strategy for the steel industry. They published the Steel Climate Standard which is a steel product classification model.
Global Warming Potential (GWP)	A measure of how much heat a greenhouse gas traps in the atmosphere over a specific time period, relative to carbon dioxide (CO2). It is expressed as a multiple of warming caused by the same mass of carbon dioxide (CO2). Therefore, CO2 has a GWP of 1. For other gases it depends on how strongly the gas absorbs thermal radiation, how quickly the gas leaves the atmosphere, and the time frame considered.
Greenhouse gas (GHG) emissions	Addition to the atmosphere of gases that are a cause of global warming, including carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, sulphur hexafluoride and nitrogen trifluoride.

GGBS (ground granulated blast furnace slag)	A by-product in the steel industry, used for example as a substitute for cement clinker.
Gross emissions	In this context gross emissions means total emissions from production, opposed to '**net emissions**' – the total emissions minus the emissions from waste fuels including non-biogenic fuels.
Industrial decarbonisation	The process of reducing or eliminating carbon dioxide emissions from industrial processes and energy consumption. This includes switching to low carbon energy sources like hydrogen and electrification, developing technologies like carbon capture and storage (CCUS), and improving energy efficiency.
Industry	In this context, industry refers to businesses and organisations engaged in manufacturing, refining, coke production and mining activities.
Intermediate products (or industrial or 'semi-finished' product)	In this context, goods produced from upstream products (e.g. raw materials) that are used in the production of downstream products (finished goods). These products undergo further processing and transformation before reaching the end consumer.
Industrial Deep Decarbonisation Initiative (IDDI)	The IDDI is a global coalition of public and private organisations who are working to stimulate demand for low carbon industrial materials. It was co-founded by the UK and India at COP26.
International Energy Agency (IEA)	The IEA works with governments and industry to shape a sustainable energy future. They provide data, analysis and policy recommendations on the global energy system and industrial decarbonisation. They have set approaches to market policies, like product classifications, to grow the market for low carbon industrial products like steel, cement and concrete.
Interoperability	The ability of a system or a product to work with other systems or products without any special effort required from the user. In a digital context, interoperability is the ability of systems to combine and use data from various sources with ease, coherence and efficiency. Similarly, in the context of carbon intensity metrics, interoperability would facilitate the combination and use of data from various sources and ensure correct comparisons.

Life cycle assessment (LCA)	Life cycle assessment (LCA) is a technique to assess environmental impacts associated with all the stages of a product's life, from raw material extraction through materials processing, manufacture, distribution, and use. LCAs are divided into stages (e.g. manufacture, use, and disposal) and more specific modules within those stages.
Life Cycle Inventory database	LCI databases contain information on the average environmental footprint of most materials and processes used in manufacturing goods. They are often used when creating product level LCAs, particularly when a producer requires information of which they do not have knowledge.
Low emissions products	Products manufactured producing fewer, or even zero, emissions.
Lower Carbon Concrete Group (LCCG)	Formed in 2020 under the Green Construction Board, the UK LCCG brings together professionals from the concrete and cement industry, academia and engineering to reduce the carbon footprint of concrete.
Mandatory product standards (MPS)	Regulations requiring products to meet certain criteria to be placed on the market.
Manufacturers	Manufacturers are a subset of producers who specifically focus on transforming raw materials into finished goods through various processes and machinery.
Mineral Products Association (MPA)	The MPA is the trade association for the aggregates, asphalt, cement, concrete, dimension stone, lime, mortar and industrial sand industries in the UK.
Net zero	Refers to a point at which the amount of greenhouse gas being put into the atmosphere by human activity in the UK equals the amount of greenhouse gas that is being taken out of the atmosphere.
Offsets	A reduction in greenhouse gas emissions, or an increase in carbon storage (for example through land restoration or planting trees) to compensate for emissions that occur elsewhere.
Operationally ready	In this context, operationally ready refers to a policy, standard, (or similar) that can be adopted without further work to create or implement.
Organisation for Economic Co-operation and Development (OECD)	A forum and knowledge hub for data, analysis and best practices in public policy
Primary data	Information directly collected or measured by the producer that is highly specific and accurate.

Procurement	The award, entry into, and management of a contract for the purposes of purchasing goods, works or services. Procurement may also refer to any additional steps taken for the purpose of these activities, such as preliminary market engagement.
Producers	Producers are entities or individuals that create goods or services. This can include everything from raw material extraction to the creation of finished products.
Product Carbon Footprint (PCF)	A PCF is a broad term to refer to the Co2 (and sometimes other **GHG** emissions) associated with a product. They can be generated according to a variety of measurement standards and not necessarily independently verified.
Product classification	Help to define low carbon steel, cement, and concrete by establishing a model that categorises these products based on their embodied emissions. These models set thresholds for different levels of emissions intensity (such as A to G ratings), helping buyers compare and understand the climate impact of their purchases.
Product labelling	A mark or label on a product's packaging which conveys information to the consumer about the product's unique value. For example, a label might signal that a product has been certified as meeting a particular standard. Ecolabelling is a specific form of product labelling that certifies a product's environmental impacts based on defined criteria and thresholds, empowering consumers to make informed, sustainable choices.
Publicly Available Specification (PAS)	Publicly Available Specifications (PAS) are fast-track standardisation documents, specifications, codes of practice or guidelines developed by sponsoring organisations to meet an immediate market need. It is the BSI Group who develop PASs in the UK which set industry-wide standards and are produced collaboratively by key stakeholders. They closely resemble a formal standard in structure and format and, if a majority consensus can be achieved and if they are endorsed by BSI, then PAS function as if they are British Standards.
Resource efficiency	Resource efficiency is the optimisation of material use so that the same level of consumption can be met with less material input. This can occur at production, consumption, or end of product life, for example: making lighter products, using recycled materials, product sharing and improving product lifespan.

ResponsibleSteel	ResponsibleSteel is a global, not for profit organisation promoting socially and environmentally responsible near zero steel production. They have established product classification for steel called ResponsibleSteel Decarbonisation Progress Levels.
Science Based Targets initiative	The Science Based Targets initiative (SBTi) is a corporate climate action organization that develops standards, tools and guidance to allow companies to set greenhouse gas (GHG) emissions reductions targets in line with requirements to keep global heating below catastrophic levels and reach net zero by 2050 at latest.
Scrap sliding scale	Scrap sliding scale is an approach to steel product classification models where thresholds change based on the proportion of scrap used in production. Producers using higher proportions of scrap face a lower (stricter) threshold than producers using lower proportions of scrap, meaning additional decarbonisation steps must be taken beyond scrap utilisation to meet better ratings.
Secondary / generic data	Data that is used by an organisation but not directly produced by it, unlike 'primary data'. Often but not always, secondary data are emissions factors where an input or precursor good (such as iron ore which is an input good for steel production) has a specified emissions factor per mass of the good. For example, an emissions intensity factor for iron ore mining (e.g. 'Xkg of Co2e per unit of iron ore') that a steel producer can use when they buy a mass of iron ore and add to their own primary data for the product carbon footprint (PCF).
Sector	A grouping of businesses that procure or sell similar products (e.g. the chemicals sector).
Small and medium-sized enterprises (SMEs)	To qualify as an SME an enterprise must have: a. fewer than 250 staff; and b. less than or equal to £44m in annual turnover or a balance sheet total of less than or equal to £38m.
Steel	Steel is an alloy primarily made from iron and carbon.
Strength class	Strength classes categorise concrete based on its compressive strength, measured in megapascals (MPa) after 28 days of curing. These classes ensure that the concrete used in construction meets the necessary performance requirements for safety and durability.
Supply chain	The entire process of making and selling goods, which may involve intermediate products transferring between businesses who undertake different manufacturing stages, before becoming end-consumer products.

System boundary	The parameters of emissions measurement in a product's production process. A wider system boundary or 'scope' includes more environmental impacts, such as GHG emissions from input goods and transport of those goods (upstream) or GHG emissions from the use and disposal of products (downstream). Different standards categorise and include or exclude activities differently.
The International Organization for Standardization (ISO)	ISO is an independent, non-governmental international organisation that produces standards, including many relevant to low carbon products. The ISO 14000 series is a family of standards focussing on environmental management systems (EMS). An EMS is a system which integrates policy, procedures and processes for training of personnel, monitoring, summarising, and reporting of specialised environmental performance information to internal and external stakeholders of a firm.
Upstream products	Raw materials and intermediate goods obtained from initial extraction or production processes, which are then processed further before being bought by consumers.
U.S. Environmental Protection Agency (EPA)	The U.S. EPA holds responsibility for the protection of human health and the environment in the US. They also issued interim determinations outlining criteria for the Federal Highway Administration (FHWA) and the General Services Administration (GSA) to select lower emissions materials.
Value-retained products (VRP)	Activities that involve or enable the extension of a product's service life beyond its original expected lifespan. These processes include reuse, repair, refurbishment, and remanufacturing. Key enablers to VRP include design and manufacture to enable continued use, and business model innovation such as "through-life engineering services", sharing and servitisation (providing services). After a VRP, the same form as the original product is retained, thus displacing the emissions associated with production of a new product with only the lower emissions associated with the VRP.
Verification	Verification ensures the accuracy, reliability, and transparency of environmental claims. In an EPD context, verification must be independent and, ensuring the EPD aligns with relevant standards and provides a credible assessment of a product's environmental impact.
World Steel Association (worldsteel)	Worldsteel is a non-profit organisation that represents the global steel industry.
World Trade Organisation (WTO)	An international body that regulates and facilitates global trade between nations.

Annex B: Consultation questions

1.1 Please indicate how relevant you think each primary assessment criterion is and explain your reasoning as well as any additional views, including whether there are other criteria not listed that should be included when considering policy options.

1.2 Which environmental impacts should the government consider at this stage in its policies? Please explain your reasoning.

1.3 Considering the objectives of this policy framework, to grow the market for low carbon products, which of the following do you think will be impacted? Please explain your reasoning with reference to specific policies.

1.4 Are you taking embodied emissions into account when making purchasing decisions?

1.5 If response to Question 1.4 was not ‘Never’ or ‘Don’t know’ and you have accounted for embodied emissions at least sometimes, which of the products or product groups you buy does this apply to?

1.6 If response to Question 1.4 was not ‘Always’ or ‘Don’t know’ which factors prevent you from taking embodied emissions into account when making purchasing decisions?

1.7 Do you agree or disagree that you have sufficient access to embodied emissions data to support your decision-making? Please explain your reasoning, including examples of existing sources for this data and additional data which you would find valuable.

1.8 Would you consider paying more for products with a lower embodied carbon content? Please explain your reasoning.

1.9 If you answered yes to question 1.8, on average, how much extra would you be willing to spend?

1.10 How likely are you to increase the proportion of low carbon products in your purchases in the future? Please explain your reasoning including what factors would support the increased proportion of low carbon products you purchase.

1.11 To what extent would a future of increased consumer demand for low carbon products would have the below impacts? Please explain your reasoning.

1.12 To what extent would improved information on the embodied emissions throughout the value chain help you achieve your decarbonisation goals, and implement any of the below measures and/or technologies? Please explain your reasoning.

1.13 Do you have existing relationships with lower carbon steel/cement/concrete producers? If so, please provide details.

2.1 Do you agree or disagree that producers and buyers of in-scope products are the main intended end users of the EERF? Are there any additional end users that should be considered? Please explain your reasoning.

2.2 What do you consider are the benefits of measuring and reporting embodied emissions?

2.3 Do you believe that there are barriers to measuring and reporting embodied emissions?

2.4 If you are a producer or practitioner, do you currently measure embodied emissions? If so, please provide details of the processes, methodologies and standards that you follow, as well as any secondary data that you may use.

2.5 If you currently measure embodied emissions, what are the costs of this activity? Please provide context.

2.6 Do you agree or disagree with the government's proposal to initially introduce the EERF on a voluntary basis? Please explain your reasoning.

2.7 Do you agree or disagree that a potential transition to a mandatory approach to reporting embodied emissions of products in the longer-term could be beneficial? Please explain your reasoning and whether you see any risks or opportunities.

2.8 Should there be a common methodology and standard for EERF guidance and should this represent best practice or minimum requirement? Please explain your reasoning.

2.9 Do you agree or disagree that the initial EERF guidance should focus on life cycle assessment (LCA) based approaches to reporting? Please explain your reasoning.

2.10 Is there anything else that the government should consider regarding maximising use of existing data?

3.1 Which option for the reporting metric do you think the guidance should recommend? Please explain your reasoning, and details of any alternative options.

3.2 Which part of the product's life cycle should the EERF guidance recommend reporting on? Please explain your reasoning.

3.3 For steel producers, which of the options for reporting standards should the EERF guidance endorse? Please explain your reasoning.

3.4 For cement and concrete producers which of the options for reporting standards should the EERF guidance endorse? Please explain your reasoning.

3.5 Do you think the EPD verification system is sufficiently robust?

3.6 If you believe that there are issues with the EPD verification process, which of the below possible issues apply? Please explain your reasoning.

3.7 Do you believe that any of the following possible government interventions could help improve the robustness and quality of the current EPD verification process and capacity in the market? Please explain your reasoning.

3.8 Which options should the EERF guidance recommend regarding secondary data? Please explain your reasoning.

3.9 If you answered Option 1 to Question 3.8, which secondary database do you think reporting should be in accordance with for cement and concrete? Please explain your reasoning.

3.10 If you answered Option 1 to Question 3.8, which secondary database do you think reporting should be in accordance with for steel? Please explain your reasoning.

3.11 Separate to the specific rules of product classifications, do you consider that the EERF guidance should specify a particular allocation of co-products method and if so what method? Please explain your reasoning.

3.12 Do you agree or disagree with the proposal that both net and gross emissions figures from production should be reported in the EERF guidance? Please explain your reasoning.

3.13 Do you agree or disagree with this proposal to use gross emissions (which include emissions from non-biogenic waste) when a single emissions figure is required? Please explain your reasoning.

3.14 Do you agree or disagree with the proposed guidance recommending reporting the embodied emissions of products in accordance with BS EN 15941? Please explain your reasoning.

3.15 Considering the objectives of this section and the proposed emissions reporting guidance, are there any other methodological areas where respondents think there needs to be a consistent or coordinated approach, or other considerations that the government should be aware of?

4.1 Where do you currently get data for product level embodied emissions reporting from?

4.2 What limitations, if any, do you or your business currently face when accessing or publishing product level embodied emissions data?

4.3 Do you agree or disagree that a UK repository for embodied emissions data could help your business report emissions data? Please explain your reasoning.

4.4 Should the UK produce its own life cycle inventory with regularly updated, regionally specific data? Note that this could be built from scratch or upon existing inventories. Please provide details of any potential benefits or concerns, as well as how these may impact the completion of a life cycle analysis.

4.5 Would a product benchmarking tool that interacts with the proposed product level embodied emissions reporting database be helpful in making meaningful product comparisons and informing buying decisions? Please explain your reasoning.

4.6 What tools, such as an EPD generator or a product carbon tool, if any, do you currently use when producing embodied emissions data? Please provide details of the features and benefits.

4.7 What tools, such as an EPD generator or a product carbon tool, if any, should government explore producing to reduce the administrative burden of producing EPDs? Please provide details of the features and benefits.

5.1 Do you currently use any form of product classifications, whether as a manufacturer, supplier, or buyer? If yes, please specify which one(s)?

5.2 If you answered no to Question 5.1, are you interested in starting to use product classifications? Please explain your reasoning, and details of any potential benefits, barriers, or challenges (such as financial implications) you foresee.

5.3 Is there anything that the government should consider regarding its intention to use existing, sector-specific product classifications, rather than develop its own (including any single, cross-sector model)?

5.4 Which option for the approach to product classifications would be most appropriate as a basis of green procurement policies? Please explain your reasoning.

5.5 Are there any other steel product classification options that the government has not identified and should consider as potentially suitable, in particular for use in green procurement policies? If so, please provide details.

5.6 Do you agree or disagree that the above is an accurate understanding of the key differences between steel product classifications? Please explain your reasoning, and if any other differences should be considered.

5.7 Do you agree or disagree that the government should use a steel product classification that uses a scrap sliding scale? Please explain your reasoning.

5.8 Is there anything else the government should consider regarding the ResponsibleSteel Decarbonisation Progress Levels (DPLs), or any points of the description, potential advantages, or disadvantages that you disagree with?

5.9 Do you believe that the emissions reporting and verification requirements to use the ResponsibleSteel Decarbonisation Progress Levels (DPLs) are robust and appropriate for use in green procurement policies, or not? Please explain your reasoning.

5.10 Is there anything else the government should consider regarding the Low Emission Steel Standard (LESS), or any points of the description, potential advantages, or disadvantages that you disagree with?

5.11 Do you believe that the emissions reporting and verification requirements to use the Low Emission Steel Standard (LESS) are robust and appropriate for use in green procurement policies, or not? Please explain your reasoning.

5.12 Is there anything else the government should consider regarding the Global Steel Climate Council's (GSCC) product standard, or any points of the description, potential advantages, or disadvantages that you disagree with?

5.13 Do you believe that the emissions reporting and verification requirements to use the Global Steel Climate Council's (GSCC) product standard are robust and appropriate for use in green procurement policies, or not? Please explain your reasoning.

5.14 Is there anything else the government should consider regarding the green steel scale in the Construction Leadership Council's (CLC) Five Client Carbon Commitments (5CCCs), or any points of the description, potential advantages, or disadvantages that you disagree with?

5.15 Is there anything else the government should consider regarding the U.S. Environmental Protection Agency's (EPA) approach to setting limits for low embodied carbon steel, or any points of the description, potential advantages, or disadvantages that you disagree with?

5.16 Which of the following steel product classification option(s) is best suited to provide an accurate basis for classifying steel products as low carbon? Please explain your reasoning, especially if you are selecting multiple options or if you have a preference.

5.17 Which steel product classification option is best suited to encourage and support improved resource efficiency and a circular economy? Please explain your reasoning.

5.18 Are there any other considerations that the government should consider regarding the reporting and verification of product level embodied emissions data with respect to the use of steel product classifications? Please explain your reasoning.

5.19 Are there any other concrete product classification options that the government has not identified and should consider as potentially suitable, in particular for use in green procurement policies? If so, please provide details.

5.20 Do you agree or disagree that the above is an accurate understanding of the key differences between concrete product classifications? Please explain your reasoning, and if any other differences should be considered.

5.21 Is there anything else the government should consider regarding the Lower Carbon Concrete Group's (LCCG) Market Benchmark, or any points of the description, potential advantages, or disadvantages that you disagree with?

5.22 Is there anything else the government should consider regarding Arup-UKRI's Universal Classification for embodied carbon of concrete, or any points of the description, potential advantages, or disadvantages that you disagree with?

5.23 Is there anything else the government should consider regarding the GCCA's Global Ratings adapted for the UK by the MPA, or any points of the description, potential advantages, or disadvantages that you disagree with?

5.24 Which of the following concrete product classification option(s) is best suited to provide an accurate basis for classifying concrete products as low carbon? Please explain your reasoning, especially if you are selecting multiple options or if you have a preference.

5.25 Which concrete product classification option is best suited to encourage and support improved resource efficiency and a circular economy? Please explain your reasoning.

5.26 Do you think that a 'combined approach', such as the Universal Classification and Market Benchmark, could be utilised for procurement guidance? If so, how useful do you think it would be in practice? Please explain your reasoning.

5.27 Are there any other examples of cement product classifications that the government should consider? If so, please provide details.

5.28 Do you agree or disagree with the government's proposed approach to not initially pursue a cement product classification? Please explain your reasoning, including examples of when it could be helpful to use a cement classification in addition to concrete.

5.29 In addition to product classifications, are there any policy approaches should government take to support the scale up of supplementary cementitious materials (SCMs)? What changes may be required to ensure that some potentially promising SCMs are not disadvantaged?

6.1 If you are a procurer, does your organisation already practice any product level green procurement policies? If so, please provide details.

6.2 If you are a procurer, do you already require embodied emissions data to be provided by potential suppliers? If so, please provide details.

6.3 If you are a procurer, do you already use any examples of product classifications in your policies? If so, please provide details.

6.4 Do you agree or disagree with our overview of the barriers and possible limitations of the current green procurement landscape? Please explain your reasoning, including any others that the government should consider.

6.5 Do you agree or disagree with our proposal to develop green procurement guidance for buying low carbon products? Please explain your reasoning, and if you disagree, please provide any suggestions for alternatives.

6.6 Do you agree or disagree with the proposal to introduce best practice, voluntary green procurement standards into the Government Buying Standards? Please explain your reasoning, including whether there are any other procurement guidance documents that should be considered.

6.7 Would you agree or disagree with the prospect of the best practice guidance being made mandatory for government departments through the Government Buying Standards in future? Please explain your reasoning.

6.8 Do you agree or disagree with the above proposal to develop stage 1: core guidance as set out above? Please explain your reasoning.

6.9 Do you agree or disagree with the above proposal to develop stage 2: expanded guidance as set out above? Please explain your reasoning.

6.10 Do you agree or disagree with our proposal to develop stage 3 'high ambition guidance' as described above? Please explain your reasoning.

6.11 Do you agree or disagree with the proposed types of evidence outlined, or are there other sources of evidence that should be considered? Please provide details and explain your reasoning.

6.12 What would be the cost implications of procuring low carbon products? Please provide details, including how this might change over time.

6.13 Do you agree or disagree with including circular economy principles alongside advice in the GBS on procuring low carbon products? Please explain your reasoning.

6.14 Are there other public procurement guidance documents where circular economy principles should be included? Please explain your reasoning.

7.1 Is there anything else that the government should consider in terms of its objectives, audiences, and possible use cases for any future work on product ecolabelling? If so, please provide details.

7.2 Do you agree or disagree that either approaches A or B, to (A) utilise existing ecolabels, or (B) develop new forms of ecolabel could be beneficial? Please explain your reasoning and specify if there are any options within these approaches that the government should consider.

7.3 Do you believe that the EU's development of Digital Product Passports (DPPs) for steel and cement will create opportunities or challenges for UK businesses and the government's objectives for ecolabelling? Please explain your reasoning and provide details of any specific opportunities or challenges that the government should consider.

7.4 Should the government consider any additional information or developments since the previous consultation as the government continues to explore whether there is a role for mandatory product standards (MPS) from the late 2020s?

7.5 Which of the proposed strategic approaches to expansion do you prefer? Please explain your reasoning.

7.6 Regardless of overall strategic approach, please note any specific sectors you think should be a priority in any future expansion of low carbon product market policies. Please explain your reasoning.

7.7 Should the government explore any of the long-term policies suggested in this section? Please explain your reasoning.