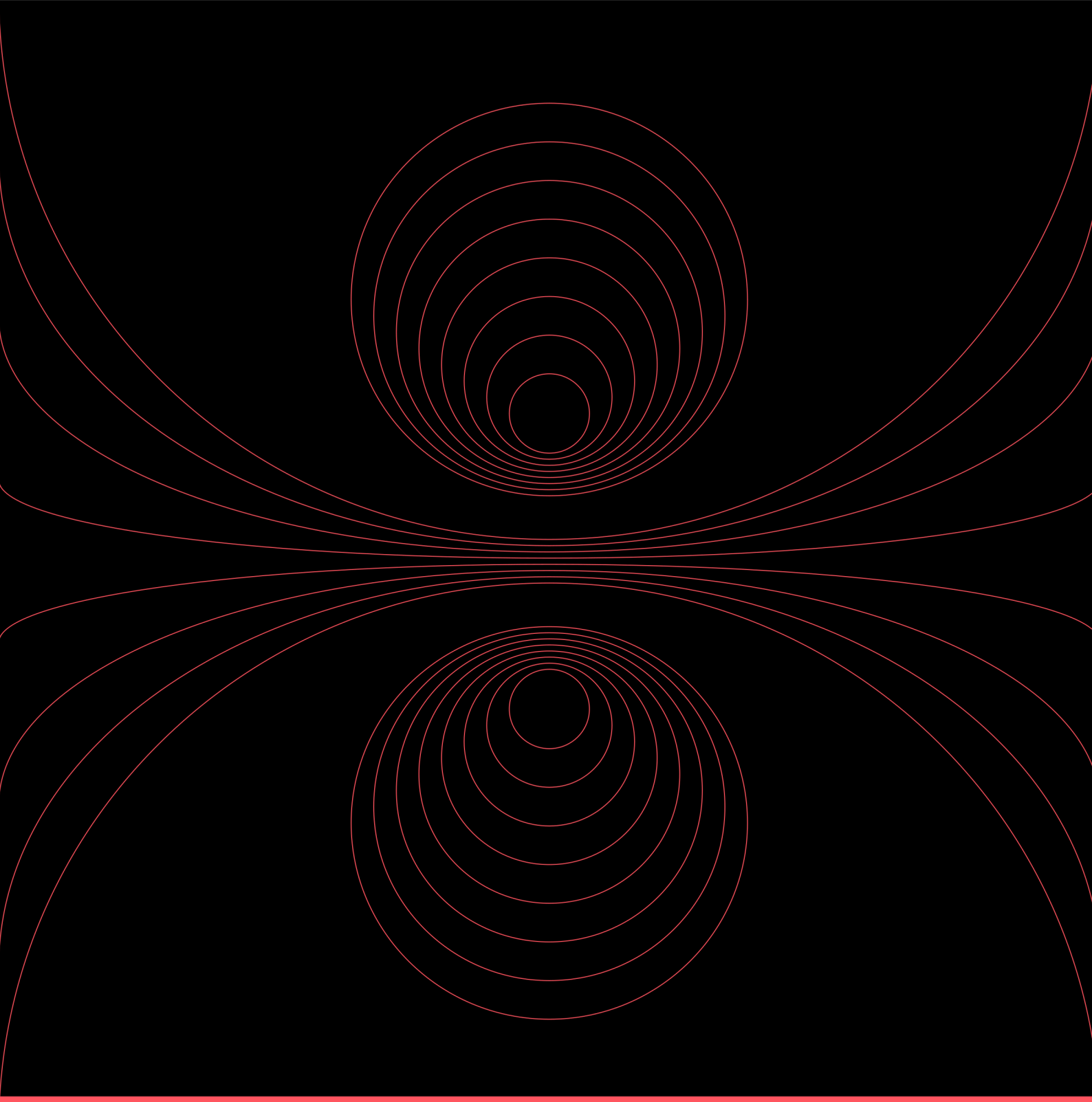

Consultation
29 September 2025

Growing the market for low carbon industrial products: policy framework

Carbon Balance Initiative

CLEAN AIR TASK FORCE

Summary

Carbon Balance Initiative and Clean Air Task Force welcome the recent technical consultation dated June 2025, as how to create a policy framework to grow the market for low carbon industrial products. In response to the questions outlined in the consultation, we emphasise that:

- Carbon Balance Initiative and Clean Air Task Force strongly support the Government's ambition to grow the market for low-carbon industrial products. However, **voluntary measures alone are insufficient** to achieve the scale of industrial decarbonisation required to meet the UK's carbon budgets and the Paris Agreement goals. **A phased but binding transition to mandatory embodied emissions reporting by 2029 is essential** to provide the scale, certainty, and investment confidence that UK industry requires.

- Our submission supports a prescriptive, life-cycle assessment (LCA)–based methodology as the foundation of the Embodied Emissions Reporting Framework (EERF). Gross emissions should be used as the principal reporting metric, and all data should be reported in accordance with BS EN 15941. **Aligning UK reporting with EU and international standards** will ensure comparability, reduce administrative burdens, and **protect UK export access to low-carbon markets.**

- Three major barriers are identified: **the lack of standardised methodologies**, the **scarcity and inconsistency of data,** particularly in complex sectors such as chemicals, and **weak market and policy signals that create a first-mover disadvantage** for firms investing in cleaner production. These barriers can be addressed through upstream regulatory tools, including a Carbon Takeback Obligation, which would simplify accounting and strengthen demand for low-carbon materials.

- Public procurement is highlighted as a critical mechanism for creating systematic market demand. **Our submission supports the integration of green procurement guidance into the Government Buying Standards**, accompanied by a clear timeline for making these standards mandatory within this parliamentary term. Although low-carbon materials currently carry a green premium of up to 30%, the overall cost impact on final products or projects is typically only 1–2% and will decline as technologies mature. **Our submission proposes a twin-track framework for expanding low-carbon product policies**.
  A Fast Track should focus on construction-related sectors such as glass, ceramics, asphalt, and plastics, which are ready for implementation and leverage significant procurement demand. **A Development Track** should target high-emission but complex sectors such as chemicals and food & drink, beginning with data collection and voluntary reporting frameworks. A dedicated governing body should coordinate this expansion, standardise methodologies, and manage the transition from voluntary to mandatory regimes.

- Our submission **supports the use of ResponsibleSteel Decarbonisation Progress Levels (DPLs) and the Low Emission Steel Standard (LESS) for steel classification, and the Universal Classification and GCCA Global Ratings for concrete.** It also recommends the development of a cement label aligned with EU frameworks and calls for integrated ecolabelling systems linked to embodied carbon data and EU Digital Product Passports.

- **In the longer term, the Government should adopt mandates or quotas for near-zero-emission materials to provide predictable demand growth**, and embodied carbon limits on major products and buildings (for example through the proposed Part Z amendment to the Building Regulations). Collaborative procurement alliances and public–private off-take mechanisms should also be developed to de-risk early projects and accelerate investment in deep decarbonisation technologies.**Taken together, mandatory reporting, green procurement, and product standards can create transparent and reliable markets for low-carbon industrial products.** This integrated policy approach will deliver investment certainty, drive down costs over time, and position the UK as a global leader in industrial decarbonisation.

Consultation response by

Carbon Balance Initiative
Clean Air Task Force

About Carbon Balance Initiative

Carbon Balance Initiative is an independent NGO founded at the University of Oxford. We deliver novel research and advocacy to support science-driven policy for governments, multilateral institutions, and the private sector. Our focus is on aligning the fossil fuel and industrial sectors with geological net zero, ensuring that any remaining emissions are balanced by permanent carbon storage to meet 1.5°C–2°C climate goals. Visit us at carbon-balance.earth.

About Clean Air Task Force

Clean Air Task Force (CATF) is a global nonprofit organization working to safeguard against the worst impacts of climate change by catalysing the rapid development and deployment of low-carbon energy and other climate-protecting technologies. With more than 25 years of internationally recognized expertise on climate policy and a fierce commitment to exploring all potential solutions, CATF is a pragmatic, non-ideological advocacy group with the bold ideas needed to address climate change. CATF has offices in Boston, Washington D.C., and Brussels, with staff working virtually around the world. Visit catf.us

Questions?

Do contact Rachel Ardiff at rachel.ardiff@carbon-balance.earth

2.2 What do you consider are the benefits of measuring and reporting embodied emissions?
Consistent reporting of embodied emissions is a prerequisite for establishing a 'green premium' on decarbonised products, building voluntary market demand for those products, and enabling the necessary mandatory demand-side policies needed to grow the market for decarbonised products.

Consistent approaches should simplify the reporting challenge for businesses, which in many cases currently need to follow distinctive protocols for different sectors or regions. While larger companies may have well-established procedures for emissions reporting, a harmonised and simple-to-use system, knowledge sharing within sectors, and clear guidance from the government will help smaller companies to rapidly adopt effective reporting protocols.

2.3 Do you believe that there are barriers to measuring and reporting embodied emissions?
There are a number of barriers to measuring and reporting embodied emissions. We emphasise three overarching categories: (1) lack of agreed, standardised methodology, (2) lack of available and consistent data, (3) weak market and policy signals.

Barrier 1: Lack of agreed, standardised methodology. Whilst methodologies do exist, there is no single agreed standard for measuring embodied carbon, creating issues of comparability, consistency and the reliability of environmental claims. Multiple definitions of "low carbon" can cause confusion for businesses, and inconsistent accounting can lead to allocative inefficiencies where genuinely more carbon-efficient products fail to secure a green premium because they use a less favourable methodology. Businesses also face increased administrative burdens in the selection process between different approaches, as well as when interpreting flexibility within existing life-cycle assessment standards. A consistent, mandatory approach is essential, particularly given the risk of divergence from mandatory EU standards that will apply to British exports. For example, the EU already requires environmental performance reporting for many industrial products (e.g. the Construction Products Regulation) and some Member States have set embodied carbon requirements for new buildings.

Barrier 2: Lack of available and consistent data Data gaps in industrial emissions reporting are especially acute in complex sectors such as chemicals, which encompass a wide array of specialist and consumer products serving diverse end-uses. Tracking material flows across such a fragmented sector
creates a substantial administrative burden. A government commitment to a comprehensive study mapping UK chemical flows and domestic versus import dependencies could establish the missing evidence base. This could support the development of emissions reporting for priority chemicals, similar to existing initiatives in steel (e.g. the SUSTAIN database and UK Steel Roadmap) and cement (e.g. the MPA's net zero roadmap and annual sustainability reporting).

Barrier 3: Weak market and policy signals Current policy largely focuses on scaling up clean technology supply, without creating systematic market demand for clean products. This fails to incentivise the measurement and reporting of embodied emissions. Without mandatory reporting or reduction requirements, one of the core market failures remains unaddressed: the 'first-mover disadvantage', where firms that invest in cleaner production cannot compete on price against high-carbon alternatives. In the absence of systematic demand and emission transparency, producers and investors face high uncertainty about returns of a decarbonisation investment. Voluntary initiatives remain too limited in uptake, despite initial promise.

Regulatory mandates are, therefore, a missing tool. These could include embodied carbon disclosure requirements or upstream obligations such as a Carbon Takeback Obligation [1], which would place the responsibility for accounting and storage on producers and importers of fossil fuels, rather than requiring every downstream user to calculate embodied emissions across complex value chains. Such an approach could simplify measurement and reporting requirements. By ensuring that upstream actors account for the eventual storage of carbon, downstream firms would not need to establish a parallel, product-by-product embodied carbon reporting systems, lowering administrative burdens and improving consistency across sectors. In this way, upstream mandates both create a robust demand signal for low-carbon products and remove a major practical barrier to reporting.

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.

We disagree with the government's proposal. Introducing the EERF solely on a voluntary basis will not generate the demand signals, consistency or scale required to drive deep industrial decarbonisation. We support a phased pathway in which an initial voluntary stage is acceptable only if it comes with a clear and binding timeline for transition to mandatory disclosure before the end of this Parliament in 2029.

Voluntary approaches have consistently underperformed, failing to generate the scale of change necessary to drive deep decarbonisation in line with the UK's climate targets. Voluntary standards tend to attract low-carbon frontrunners rather than high-carbon incumbents, failing to provide reliable data and implementation at scale. Industry has reported that a lack of reliable and consistent data has hindered investment decisions [2]. Similarly, the Climate Change Committee (2023) has expressed concern that over-reliance on voluntary uptake increases the risk of missing industrial decarbonisation targets [3]. With consumers continuing to prioritise cost and quality over carbon performance, voluntary disclosure alone will not unlock the investment needed [2].

Relying on voluntary action also creates market distortions and fragmentation. Ambitious firms risk being undercut by higher-carbon competitors, while multiple competing voluntary standards generate inconsistency and confusion for buyers. This undermines both investor confidence and the competitiveness of UK low-carbon products. By contrast, mandatory approaches have proven effective in driving change. Past EU reporting schemes demonstrate that compulsory disclosure delivers consistent, comparable information and provides certainty for investors. The EU's 2024 reforms to the Construction Products Regulation and the Ecodesign for Sustainable Products Regulation, alongside national policies such as France's RE2020, show how mandatory measures can embed carbon thresholds into procurement and regulation. If the UK delays, it risks losing competitiveness, export access to the EU and the ability to shape emerging international rules.

A phased mandatory pathway is both necessary and feasible. A short voluntary phase could help test methodologies and build capacity, but this must be time-limited and communicated as such. Mandatory disclosure should begin with larger firms and the most carbon-intensive products, with coverage expanding over time to allow smaller businesses proportionate timelines. We recognise the challenges for SMEs, including higher administrative costs and limited capacity to collect data. Policy design must therefore minimise burdens by providing standardised reporting methods and clear guidance to reduce costs, alongside targeted government support for firms that may struggle with data collection.

Clear milestones must be set, with mandatory disclosure fully in place before 2029 to align with the UK carbon budgets, which require around an 8% annual reduction in industrial emissions up to 2030. This would also mirror EU requirements, which mandate reporting from 2028 and embodied carbon limits from 2030. In conclusion, voluntary reporting may play a limited role as a "stepping stone", but only mandatory standards, phased in with a clear and binding timeline, will deliver the scale, certainty, and fairness required to unlock investment, create a level playing field, and ensure UK industry remains competitive while meeting its climate targets.

2.7 Do you agree or disagree that a potential transaction 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

We strongly agree with this statement. A transition to mandatory reporting is essential, but should be accompanied by a clear timeline. Only mandatory disclosure can generate the transparency, comparable data needed to design low-carbon product standards, unlock investment, and ensure the UK remains in line with international standards, best-practice examples, and pathways to achieving the Paris Agreement temperature goals.

Mandatory reporting would establish a reliable evidence base for embodied emissions for sectors. This transparency is the foundation for future policies such as product standards and procurement mandates, which are among the most effective tools for driving demand, creating clear market signals for investment in clean technologies and achieving the national carbon budgets. It would also align the UK with international best practice, such as the EU's effort to embed embodied carbon requirements through the Ecodesign for Sustainable Products Regulation and Construction Products Regulation. These measurements demonstrate that mandatory approaches work on delivering decarbonisation and cost efficiency. The EU's Ecodesign measures, which impose mandatory energy efficiency standards on energy-related products sold in the EU, have reduced energy costs faced by consumers by an estimated €120bn in 2021 and are estimated to have reduced EU primary energy demand by 7% per year [2]. Without the information provided by mandatory emissions reporting, there will be no foundation on which to build these kinds of policies in the UK. If the UK lags, it risks losing export access to EU markets and forfeiting the opportunity to shape emerging international norms. The introduction of mandatory reporting before the end of this Parliamentary term, namely in 2029, also leverages the policy window created by the Carbon Border Adjustment Mechanism (CBAM) to level the playing field with importers.

Mandatory reporting also provides the certainty investors and manufacturers require to commit to large-scale capital investments in industrial decarbonisation. Voluntary coalitions such as SteelZero, ConcreteZero, and the First Movers Coalition illustrate that demand exists, but without a mandatory framework, it remains too shallow to drive systemic change. By contrast, mandatory disclosure would create a level playing field, prevent higher-carbon producers from undercutting frontrunners, and support the development of benchmarks and labels that enhance buyer confidence. We recognise that compliance costs may fall disproportionately on SMEs, which often face higher administrative burdens and lack in-house expertise to conduct detailed lifecycle assessments or produce Environmental Product Declarations.

These risks can be mitigated by:

- Adopting a phased approach to implementation, starting with large firms and the most carbon-intensive products, then expanding coverage over time.
- Standardising methodologies and guidance to harmonised reporting frameworks, reduce complexity and compliance costs.
- Pursuing targeted support for SMEs, such as government-backed technical assistance and cost-sharing mechanisms to help smaller manufacturers participate.
- Recognising the international sensitivity by: creating exemptions for onerous certification requirements that risk excluding small enterprises in low-income countries, as well as introducing policies to support capacity-building and fair access.

Concerns about market distortions can also be addressed through a coherent policy package spanning the value chain. Upstream measures such as carbon takeback obligations can ensure fossil feedstocks are decarbonised; midstream measures such as harmonised reporting provide transparency; and downstream measures such as product standards and green public procurement guarantee demand for low-carbon products. Taken together, this integrated approach avoids loopholes, drives adoption, and ensures that data collection translates into real emissions reductions.

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

Option 2: Prescriptive best practice guidance
We believe 'Option 2. Prescriptive guidance on best practice' will be the most effective at driving significant standardisation and improvements in reporting across the economy.

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.

We agree that EERF guidance should focus on a life cycle assessment (LCA) based approach to reporting. LCA provides a whole-system perspective by including both upstream input and downstream use-phase and end-of-life emissions. This level of information is essential if the EERF is to serve as the foundation for future reforms such as mandatory product standards, procurement mandates, and embodied carbon limits. By contrast, installation-level data omits major portions of the value chain and would require significant expansion in scope before it could meet the requirements of embodied emissions reporting.

Use of LCA aligns the UK with international standards. The EU has already anchored mandatory construction product reporting in LCA methodologies through the revised Construction Products Regulation (2025) and is well established in global supply chains via Environmental Product Declarations (EPDs). Anchoring the EERF in internationally recognised methodology avoids unnecessary development of new systems, reducing administrative burdens by ensuring interoperability with international markets and reducing compliance costs. The UK ETS and EU ETS data for emitters can also be incorporated into LCA-based reporting. Similarly, embodied carbon limits, defined as caps on the total life-cycle emissions of a final product, cannot be credibly implemented without a whole life-cycle approach.

A whole-life approach is particularly important to avoid unintended substitution between products. For example, lifecycle-based reporting enables consumers to distinguish between materials that can be recycled versus those destined for landfill, reducing the risk that a narrow focus on embodied carbon alone would shift emissions elsewhere. We recognise that current LCA practice faces challenges, including inconsistencies across studies and potential costs for new adopters. However, these should be addressed through clear government guidance to improve comparability, expand data availability, and focus on ensuring rigorous accounting of fossil carbon emissions.

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.

We recommend Option 1, that the declared unit be used across all relevant products, as it improves comparability between different products and helps highlight where significant steps have been taken to decarbonise upstream production, which are typically the most emissions-intensive. Functional units should also be provided where available.

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.

We recommend Option 1, that the declared unit be used across all relevant products, as it improves comparability between different products and helps highlight where significant steps have been taken to decarbonise upstream production, which are typically the most emissions-intensive. Functional units should also be provided where available.

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]

Agree. Gross emissions are the best indication of the real fossil emissions associated with the manufacturing process and should be prioritised for inclusion. Net emissions can also be included to maximise data availability but should be clearly subordinate to gross emissions. It may also be useful to consider alternative approaches to highlighting the use of waste fuels in production, such as the proportion of total energy input.

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]

Strongly agree. The sliding scale approach helps recognise and reward investment in technologies capable of decarbonising primary steel production - a particularly hard-to-abate sector that needs to be addressed on a global level. While maximising scrap input enables an individual facility or country to reduce the carbon intensity of steel production, there is insufficient scrap to meet global steel demand, so this effectively displaces primary production elsewhere (potentially in jurisdictions with lower decarbonisation ambition). The sliding scale helps to leverage both increased scrap recycling and decarbonisation of primary steel.

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?

Reporting at the crude steel stage ensures comparability, as the hot rolling process es can have variable emissions. It is useful to have a clear label which recognises decarbonisation measures at this universal, hardest-to-abate stage, and can be used to inform procurement practice and policies. This should be used in conjunction with product carbon footprints, which will encompass all lifecycle emissions, as required under the "ResponsibleSteel" classification. An advantage is that the DPLs include upstream emissions from natural gas production, including methane leakage. Clean Air Taskforce analysis [4] as found that these emissions can represent a significant addition to total emissions for natural gas-based steel-making pathways.

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.

Agree. Gross emissions are the best indication of the real fossil emissions associated with the manufacturing process and should be prioritised for inclusion. Net emissions can also be included to maximise data availability but should be clearly subordinate to gross emissions. It may also be useful to consider alternative approaches to highlighting the use of waste fuels in production, such as the proportion of total energy input.

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]

Somewhat not robust or appropriate.

As the classification is benchmarked to current best practice, the GSCC seems less suitable for driving step changes in production technology and deep decarbonisation projects. Dynamic labels may prove challenging for establishing long-term market demand for a well-defined product.

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?

As the LCCG is benchmarked to current market performance and dynamics, it is less suitable for driving step changes in emissions reductions and providing a clear, consistent indicator to buyers. An undynamic, absolute classification appears more suitable for building a market for near-zero emission or low-carbon products over time and more useful for long-term policies aiming to build demand for those products.

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 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).

Both Option 2 and 3 provide a consistent framework for highlighting ambitious levels of decarbonisation, and their use of a universal classification system should help enable, for example, long-term offtake agreements for near-zero emission products and policies targeting their procurement over time. The inclusion of net negative products in Option 2 is useful. We recommend that the government opt for gross emissions accounting methods.

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.

Disagree. Ideally, a product classification for both cement and concrete would be implemented. A concrete label may be most useful for buyers, but an accompanying rating for cement content can help highlight action taken to decarbonise hard-to-abate cement production and can provide a more consistent point of comparison between different products. Further, the EU plans to develop a 'cement label' under the Industrial Accelerator Act and it would be useful for the UK to maximise compatibility with this system.

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.

Disagree. Ideally, a product classification for both cement and concrete would be implemented. A concrete label may be most useful for buyers, but an accompanying rating for cement content can help highlight action taken to decarbonise hard-to-abate cement production and can provide a more consistent point of comparison between different products. Further, the EU plans to develop a 'cement label' under the Industrial Accelerator Act and it would be useful for the UK to maximise compatibility with this system.

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

International evidence shows that procuring low-carbon industrial products initially carries a significant cost premium, though the relative increase diminishes substantially along the value chain. For example, clean steel currently carries a 17-34% green premium compared to conventional product [5] and hydrogen-based steel could be up to 40% more expensive in 2030 [6]. Cement prices could also nearly double at the production stage, but the effect on final building costs remains limited to around 1% [7].

Despite these high input costs, the impact on consumer products or infrastructure is small, and for procurement budgets, the downstream impact is modest. The cost of a bridge made entirely with low-carbon steel and cement rises by only 1.6% [8]. Similarly, for a €30,000 car, even if clean steel carried a 30% premium, the retail price would increase only by 0.8% [4]. These findings are consistent across studies of both steel and cement, as downstream price effects rarely exceed 1-2% while embodied emissions reductions are often 50% or more [7]. This means that although there may be higher unit costs for core materials, the overall effect on project budgets is typically in the 1-2% range.

The trajectory of costs over time is also important. In the short term (up to 2030), premiums will persist due to limited supply of low-carbon steel and cement, with undersupply projected in Europe [5]. By the mid-2030s, costs for conventional products are expected to rise as free ETS allowances are phased out [5], while learning effects, falling hydrogen prices, and maturing CCS pathways drive down clean production costs. By 2050, modelling suggests that low-carbon steel and cement could be at cost parity or even cheaper than unabated production [5] [6]. For long-term contracts, this points to a declining fiscal risk.

The distribution of costs also depends on where in the value chain low-carbon standards are applied. If only midstream standards were introduced on raw materials (e.g. cement, steel), compliance costs would likely be passed directly to downstream consumers [5]. A more balanced package, combining upstream, midstream and downstream mandates, would spread costs and promote investment. Early procurement support can play a critical role: public initiatives such as Buy Clean California and EU Green Public Procurement are already stimulating early demand for low-carbon steel and cement. This demand-pull reduces uncertainty for producers and accelerates cost convergence.

Overall, while procuring low-carbon products does entail higher initial costs, these are modest at the project level, likely to decline over time, and can be managed through smart procurement design and supportive policy frameworks.

Question 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.

We agree with the government's assessment of barriers and limitations in the current green procurement landscape. The identified issues around consistency and misunderstanding are fundamental obstacles that must be overcome to create effective green procurement policies.

The government should also consider an additional critical barrier: the lack of clear timelines for transitioning from voluntary to mandatory approaches in existing and planned policies. Mandatory approaches on clear timelines are favoured by industry for clearer forward planning, and have a tangible emissions impact compared to voluntary guidelines [2][9]. For example, research conducted by Frontier Economics for the Aldersgate Group with extensive input from across different industry stakeholders, found that "stakeholders overwhelmingly reported that voluntary standards are unlikely to produce the significant change needed to establish markets for low carbon industrial products, and that standards need to be set at a mandatory level to have an effective impact on reducing emissions."[9]

Without clear progression pathways, voluntary measures, including in public procurement guidance, risk the limited uptake demonstrated by existing initiatives like SteelZero and ConcreteZero, which, while promising, show insufficient market diffusion to drive the industrial transformation needed to meet UK carbon budgets, which require an 8% reduction in industrial emissions annually by 2030 [10].

Question 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.

Agree. We strongly support the development of green procurement guidance, as it represents a crucial policy lever for industrial decarbonisation.

Currently, policy focus is primarily on the supply side, rather than on creating systematic market demand for clean products. This fails to address the 'first-mover disadvantage' where companies investing in clean production cannot compete on price against high-carbon alternatives, leaving producers and investors facing unacceptably high uncertainty about the returns they will receive on clean technology investments.

Procurement guidance can address these market failures by creating systematic demand, providing the long-term investment certainty required to scale up low-carbon products. Government standards can then act as a precursor to prepare the wider market for more widely applied procurement regulations. International experience demonstrates the effectiveness of this approach. France's RE2020 regulation, for example, has moved to mandating lifecycle carbon assessments for new buildings with targets tightening toward net zero by 2050, creating clear market signals for lower-carbon construction materials [11].

In addition to identifying appropriate product classifications and accounting methodologies for embodied carbon, the guidance could set out clear expectations for companies aiming for particularly high-ambition clean production processes, which can help drive transformational technologies.

This could extend to establishing off-take agreements for output from planned deep decarbonisation projects in the cement and steel sectors. We recommend that Stage 3 of the guidance be launched in a preliminary form earlier in the process, through early identification of market-leading products and labels and setting thresholds for products that do not meet the standard.

This guidance must establish clear timelines for progression to mandatory standards, as outlined in Question 6.4. This is reflected in stakeholders expressing a preference for mandatory standards in order to enact deep decarbonisations [2].

Question 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.

Strongly Agree. We support incorporating voluntary green procurement standards into the Government Buying Standards, as public procurement for construction projects and buildings can help lead the way in setting a high standard for low-carbon procurement practice in this sector. It forms a logical first step that builds on existing government infrastructure while providing immediate market signals.

There should be a clear timeline for progressing the voluntary best practice standard to a mandatory standard within this parliamentary term. As explained in our response to Question 6.4 and 6.5, research indicates voluntary standards are unlikely to drive the required market transformation to drive decarbonisation. This voluntary phase should therefore act as a foundation to establish regulatory certainty while building market capability; not serve as a substitute for the mandatory action required to drive systematic change.

Question 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.

Agree. We strongly agree with making green procurement guidance mandatory as soon as it is feasible. Mandatory standards for procurement are needed to provide a more predictable market signal to developers of low-carbon manufacturing projects. The current voluntary approach is fundamentally inadequate for the scale and pace of change required. As explained in question 6.4, to meet UK Carbon Budgets, industrial emissions must decline 8% per year by 2030 [11]. This requires a supportive policy environment that includes both government support, market mechanisms such as the ETS, and regulatory instruments such as product standards and mandatory product guidance. Without regulatory backing, voluntary standards risk the limited uptake demonstrated by existing initiatives like SteelZero and ConcreteZero, which while promising, show insufficient market penetration to drive industrial transformation.

The transition to mandatory requirements should occur before 2029 as part of a coordinated package of reforms. Several critical factors support this timeline:

- **Policy alignment opportunities**: The implementation of the UK's Carbon Border Adjustment Mechanism in 2027-2028 creates a crucial policy window by levelling the playing field with importers. New reporting requirements already being implemented for international trade can be adapted to the national context and aligned with the government's proposed Embodied Emissions Reporting Framework.

This could extend to establishing off-take agreements for output from planned deep decarbonisation projects in the cement and steel sectors. We recommend that Stage 3 of the guidance be launched in a preliminary form earlier in the process, through early identification of market-leading products and labels and setting thresholds for products that do not meet the standard.

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There should be a clear timeline for progressing the voluntary best practice standard to a mandatory standard within this parliamentary term. As explained in our response to Question 6.4 and 6.5, research indicates voluntary standards are unlikely to drive the required market transformation to drive decarbonisation. This voluntary phase should therefore act as a foundation to establish regulatory certainty while building market capability; not serve as a substitute for the mandatory action required to drive systematic change.

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- **International competitiveness**: Focusing purely on voluntary standards for the coming years stands in contrast to the ambition of EU legislation, which has already implemented mandatory environmental performance reporting for many industrial products. France has already introduced embodied carbon limits for new buildings, and forthcoming EU measures, including revisions to the Construction Products Regulation and the Ecodesign for Sustainable Products Regulation, will extend requirements for disclosure and reduction of embodied emissions across construction products. The UK risks falling behind without similar regulatory frameworks, risking UK exports being excluded from key markets and the UK becoming a 'rule taker' rather than a rule maker on industrial product standards.

- **Industry support for certainty**: As the Frontier Economics research demonstrates (referenced in Question 6.4), mandatory standards ensure "that industry is competing on a level playing field, and that companies pushing further on reducing emissions are not put at a competitive disadvantage" [2]. Given existing pressures on industry, increasing political uncertainty, and fiscal constraints on public spending, ambitious and decisive action on mandate structures is needed within this parliamentary term to deliver systematic demand signals that justify large-scale private investment in clean technologies while reducing costs to the Treasury.

The mandatory approach could be phased, beginning with disclosure requirements and progressing to procurement requirements for low-carbon products by 2030 (IDDI Level 3). This timeline provides adequate industry notice while maintaining the urgency needed to achieve net zero.

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

Agree. The proposal to encourage buyers to commit to a minimum percentage of near-zero emission or highly decarbonised products could be particularly effective for driving the deployment of new technologies. Recommendations should include commitments to gradually increasing this percentage over time, while also reducing the overall embodied carbon of materials procured.

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.

Agree.

Assessments of the availability of deep decarbonisation technologies should take into account the potential for more rapid scale-up as a result of more ambitious procurement commitments and polices. In other words, supply and demand are correlated and procurement best practices should not be limited to the 'business as usual' trajectory for decarbonised processes.

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.

Ecolabelling showing independently verified environmental data based on a consistent methodology will be helpful in building demand for decarbonised products along the value chain. Ecolabels should aim to show the embodied carbon emissions for the labelled product, the embodied carbon for basic industrial inputs (cement, steel, etc.) and an appropriate product classification for those inputs. However, labelling should be used in conjunction with mandatory measures to grow demand for lower-carbon product categories.

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 3: Both approaches A and B
Option 3: Both approaches A and B have elements which could help develop an effective ecolabelling system. Using existing tools, including EPDs and existing product classifications for cement and steel, is desirable for accelerating implementation and ensuring the system is easy to use for producers. New classifications or adaptations of existing ones may be necessary for some materials. As noted above, ecolabelling should aim to highlight both the embodied carbon of the product (e.g. through existing EPDs) and the embodied carbon and 'rating' of key input materials. To this end, a label denoting 'made with low-carbon materials' or 'made with near-zero emission materials' (also denoting the percentage input) would be a valuable addition.

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?

Since the previous consultation, the EU has taken a number of steps towards introducing mandatory embodied emissions reporting and product standards, through policies such as the revised ESPR, which provides the legislative framework to implement embodied carbon limits. Embodied carbon limits on cement, steel and chemicals in the EU may be implemented through legislation associated with the Industrial Accelerator Act. This strengthens the case for the UK to consider mandatory regulations, both to maintain regulatory alignment with key trading partners and to avoid competitive disadvantages for domestic industry.

Question 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

We recommend that the Government adopt a 'twin track' approach: a "fast track" to develop low-carbon market policies for construction-related sectors (Option 1), and a "Development track" to develop policies for the next largest emitting sectors (Option 2), focusing particularly on chemicals.

The "fast track" for construction-related sectors should aim to move to mandatory reporting and embodied emissions standards and procurement mandates within this parliamentary term, with the "development track" for major emitting sectors focusing initially on data collection, standardisation, and voluntary standard development. The government should announce clear timelines which move from voluntary to mandatory standards for both tracks simultaneously. This is important because research demonstrates that early policy signals drive private investment in clean technologies even before product standards or mandates are adequately developed [12].

Evaluation Framework for strategic expansion

The strategic framework guiding further low-carbon market policy development should be based on clear criteria.

We recommend the government standardise evaluation criteria across sectors to enable systemic comparison, perhaps in a scoring system akin to the 'technology readiness level' system to create 'regulation readiness levels'. The evidence indicates several factors are important for considering sector suitability, including:

- Administrative feasibility: do robust measurement systems already exist? Are buyers and/or manufacturers concentrated? Can existing policy frameworks be leveraged?
- Climate impact: what is the absolute emission impact of this sector and its different supply chain components? How transformative would a (downstream) product standard or procurement mandates be in decarbonising manufacturing processes?
- Economic factors: what is the cost of a downstream product standard policy, and how are those costs distributed? How exposed to trade is this sector, either in its exports or imports?

Based on these factors, we propose the following prioritisation:

Fast Track: Construction-Related Sectors (Option 1)

<u>Priority sectors: Glass, ceramics, asphalt, and selected plastics</u>

Research and stakeholder engagement demonstrate that construction-related sectors demonstrate high 'regulation readiness', indicating the government should fast-track low-carbon market policies for these sectors and move to mandatory standards within this parliamentary term. Administrative feasibility is high: construction companies already conduct lifecycle assessments routinely, with clear LCA and EPD data available. The sector also benefits from concentrated buyers, particularly for larger projects, with substantial public procurement providing an immediate policy lever [13][14][15]. Buyers will already be adapting to the proposed new steel and concrete regulations from the consultation, creating natural opportunities for expanded requirements across multiple materials simultaneously while reducing administrative burden.

Furthermore, the climate impact is substantial, with embodied carbon in buildings accounting for more than 64 million tonnes of carbon annually - more than the combined emissions from aviation and shipping in the UK [16]. Cost impacts could be absorbed effectively, with studies showing that raw material cost increases translate to only 1-2% increases in total building costs while potentially delivering over 50% reduction in embodied emissions [17].

Several ready-to-go policy mechanisms exist which could drive rapid adoption of lower-carbon products in the building sector. Procurement policies on construction, such as a 'Buy Green, Buy British' procurement type mandate could benefit UK businesses investing in cleaner production processes. The industry supported 'Part Z' amendment to the 2010 building regulations provides a well-researched and strongly supported policy plan on a regulation for

embodied carbon for construction, focusing on establishing reporting for projects over 1000m2 or 10+ dwellings by 2026, with embodied carbon limits by 2028 [16]. European examples, particularly France's RE2020 policy and Denmark's National Strategy for Sustainable Construction, also provide proven implementation models. Targets to reduce embodied carbon must be used in conjunction with targets on reducing whole lifecycle emissions for buildings.

Development Track: Major Emitting Sectors (Option 2)

Priority sectors: Chemicals and Food & Drink

The highest-emitting industrial sectors after steel and cement cannot be ignored. Chemical production, responsible for a significant proportion of UK industrial emissions, represents the largest opportunity for emissions reduction.

The sector's upstream position means decarbonising primary chemicals (petrochemicals, ammonia) can reduce emissions across multiple downstream industries. The majority of emissions (around 70%) from the chemicals industry originate from a small number of sites producing basic chemicals [21]. These include steam crackers producing olefins in Fife and Grangemouth, soda ash in Winnington, and the Ineos acetyls plant in Saltend [21]. The remaining 30% of emissions are spread over a large number of small sites, which are most likely to decarbonise through electrification. It would therefore be most effective for upstream emissions reductions to develop a framework for embodied emissions reporting for base chemicals (ethylene, propylene, benzene, xylene, toluene) and their principal derivatives (particularly polyethene and polypropylene plastics). Embodied emissions reporting for soda ash would also usefully inform upstream emissions for the glass sector.

Food and Drink, the next highest emitting industrial sector, is responsible for 6.5% of total industrial emissions [21]. However, both the Food and Drink and parts of the chemicals sectors face unique implementation challenges that require systematic development work. Both sectors involve complex supply chains, diverse product categories, and insufficient data tracking for import/export flows. Interviews with industrial stakeholders confirm that "meeting a strict mandatory standard today would be difficult for most products and manufacturers" in these sectors due to limited data collection and capacity [2].

Therefore, the government should commit to developing standardised reporting requirements, with a clear timeline toward a mandatory framework. This development track should include comprehensive mapping of UK chemical material flows, establishing voluntary reporting frameworks for priority chemicals, and streamlined requirements that support SMEs.

The complexity of developing product standards requires dedicated institutional capacity with decision-making authority to work closely with industry and coordinate international efforts. We support stakeholder calls for assigning responsibility to an existing or new governing body [2] that can manage the development of both the 'priority' and 'development' tracks simultaneously, as well as review design choices, leverage existing expertise, work with international partners and industry to ensure interoperability, and manage the transition from voluntary to mandatory frameworks. The BSI's flexible standard creation process, which enabled broad stakeholder participation, could provide an effective model.

This institutional body should evaluate whether option 3 - focusing on sectors where downstream products can be developed - is a worthwhile investment of resources, identifying supply chains in which downstream standards have strong signalling effects in the supply chain.

Question 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]

Selected priorities: Asphalt, Ceramics, Chemicals, Food and Drink, Glass, Aluminium, Paper and Pulp, Plastics

Following our response to question 7.5, we believe the government needs to establish clear evaluation criteria and a strategic framework to guide expansion planning for low-carbon product market policies and assign responsibility for this to a dedicated governing body with adequate decision-making authority. This body can then systematically prioritise sectors for low-carbon product development. In line with our twin-track strategic approach laid out in question 7.5, specific sector priorities could be sequenced according to implementation readiness and strategic importance:

Fast Track Implementation (Options 2, 3, 6): Asphalt, Ceramics, Glass
These construction-related sectors should be prioritised for immediate mandatory downstream standard/mandate expansion, building on the administrative infrastructure and buyer readiness established through steel and cement standards, as laid out in question 7.5. Glass and ceramics already benefit from established measurement methodologies and concentrated buyer markets, while asphalt complements the systematic approach to decarbonising construction sector input materials.

Development Track Priority (Options 4, 5): Chemicals and Food & Drink
As the third and fourth highest-emitting sectors, chemicals and food and drink require parallel policy development to enable implementation of product market policies within this decade, aligning with net zero objectives and EU trading partner standards.

On Chemicals, we recommend prioritising this sector due to its transformational potential and upstream effects across multiple downstream industries. As noted under question 7.5, embodied emissions reporting for a few key production sites (particularly steam crackers) could cover a large portion of these emissions and should be feasible using existing reporting standards and ETS data. However, implementation for many chemicals faces significant complexity.

As a first step, the government should commit to a comprehensive mapping of UK chemical material flows and domestic versus import dependencies to establish the evidence base currently lacking. This could support the development of voluntary emissions reporting schemes for priority chemicals and industry collaboration frameworks before progressing to mandatory standards.

On Food and Drink, we find that while this sector represents lower absolute emissions than chemicals, it merits strategic prioritisation due to significant trade exposure risk. With 56% of UK food and drink exports destined for EU markets, failure to align with emerging EU product standards risks market exclusion as EU standards for food, drink and industrial products develop [2].

Stakeholder research indicates that administrative capacity for the implementation of standards in this sector is low, so data collecting and reporting requirements are necessary prerequisites for the development of low-carbon market policies, though this should be streamlined with current reporting approaches and reduce the burden on SME's and manufacturers who are already subject to the ETS.

In other sectors, research and stakeholder interviews indicate that aluminium and paper & pulp could benefit from downstream product standards through different strategic rationales.

Aluminium represents leverage for product standards because it combines high energy intensity with recyclability - creating immediate opportunities for standards that reward both recycled content and low-carbon primary production. RMI analysis demonstrates that product thresholds for embodied carbon or recycled content in transport, packaging and construction applications can create a rapid market pull for secondary metal and drive low-carbon smelting investment [14]. While UK aluminium production is very limited, downstream demand is substantial, meaning standards would primarily influence import specifications, which introduces competitiveness dynamics. The inclusion of aluminium in the UK CBAM scope could create immediate policy alignment opportunities from 2027.

Paper and Pulp benefits from mature EPD practices and clear opportunities for standards targeting recycled content, low-carbon pulp methods, and supply chain disclosure. While the sector is more fragmented, it could provide high visibility benefits through consumer-facing markets and strong circular economy co-benefits [2] [16] [19]. The sector's role in packaging could create synergies with extended producer responsibility schemes and public procurement of low-carbon packaging, meaning existing regulatory frameworks could potentially be leveraged.

Plastics. Emissions reporting for base chemicals will be relatively straightforward to extend to polyethylene and polypropylene pellets, which are the raw materials for common plastics. Plastics such as polypropylene and polyethylene terephthalate (PET) are used in construction (e.g. in insulation, pipes, building components), and could thus be included alongside other construction materials for ‘fast track’ implementation, benefiting from the same buyer familiarity and procurement processes already being developed. Frontier Economics/Aldersgate Group research also identifies plastics and packaging (mainly high-density polyethylene and PET) as strategic targets for product standards, showing downstream retailers and large brand purchasers could rapidly shift demand [2]. Standards could require recycled feedstock content, low-carbon feedstock certification, or EPD disclosure, with retail giants and large buyers able to create concentrated demand signals throughout the supply chain.

Implementation Sequencing

This sector prioritisation creates a coherent implementation roadmap: immediate mandatory expansion in construction materials (glass, ceramics, asphalt), parallel development work in major emitting sectors (chemicals, food & drink), and special consideration of bridging sectors (aluminium, plastics). The governing body should coordinate this sequencing to maximise synergies while avoiding supply chain disruptions..

Question 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

Options 1 and 2 - We recommend pursuing Option 2 as a priority, as it has the most potential to shift the market towards deep decarbonisation.

Mandates or quotas on the procurement of near-zero emission materials promise to be the most effective means of driving a rapid and predictable increase in demand for these materials, and deployment of the deep decarbonisation technologies needed for their production.

More specifically, procurement mandates should include a target proportion of near-zero emission material (e.g. cement, concrete, steel) on specified obligated entities, which can increase over time, analogously to similar mandates for sustainable aviation fuel supply and electric vehicle sales [20]. The mandated proportion can increase on a trajectory that is both compatible with net zero and feasible deployment rates for decarbonised production technologies. For example, mandates to procure near-zero emission cement could be benchmarked on the growing availability of CCS-enabled cement through projects in HyNet and the Peak Cluster. Such targets for 'high-ambition' product procurement could exist within a wider mandate to procure a high proportion of low-carbon materials meeting at least a specified product classification level. This would be analogous to the sub-mandate for PtL fuels within the SAF mandate.

Limits on the embodied carbon in end products can provide an important complement to procurement mandates, as they ensure other, potentially lower-cost levers to decarbonise are fully exploited. For instance, embodied carbon limits on building projects can drive more efficient use of carbon-intensive materials and the use of alternative, lower-carbon materials. Consumer-facing sectors with particular potential for both embodied carbon limits and material procurement mandates include buildings, automotive, plastic packaging, and food retail.

In particular, there is a significant opportunity to drive cement and steel decarbonisation through embodied carbon limits on buildings, which could be applied through the proposed 'Part Z' amendment to the Buildings Regulation [17] In this respect, the UK lags behind national legislation in several EU countries and the EU's Energy Performance of Buildings Directive, which will establish limits on embodied carbon. As cement and concrete represent a majority of embodied carbon in many building types, ambitious limits alone may drive significant change in material procurement. However, to establish a clear demand signal for the decarbonisation of hard-to-abate sectors in a timely manner, these limits should be accompanied by targeted procurement mandates or quotas on the remaining steel or cement used (as outlined above).

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