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Assessing the role of public procurement in scaling markets for low-carbon industrial products

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Contents

Executive Summary	4
Key findings of the research	4
1 Introduction	6
1.1. What are the benefits of low-carbon industrial products?	6
1.2. How can low-carbon public procurement support the growth of low-carbon industrial products ?	7
1.3. International examples of LCPP	8
1.4. Theory of change – what are the potential economic impacts of LCPP?	11
1.5. Costs and risks	15
1.6. Policy design considerations for LCPP	16
2 Identification of good candidates for low-carbon public procurement	18
2.1. Introduction	18
2.2. Products/industries covered in the assessment	18
2.3. Indicators used in the assessment	18
2.4. Scoring matrix	22
2.5. Assessment of scoring outcomes and deep-dives into the most relevant products	29
Deep-dives into the most relevant products	30
3 Conclusion	32
4 References	33
4.1. References used in <i>Chapter 1: Introduction</i> and <i>Chapter 2: The impact pathway of low-carbon public procurement: theory of change</i>	33
4.2. References used for the assessment presented in <i>Chapter 3: Identification of good candidates for low-carbon public procurement</i>	36
5 Annex I: Calculation of the indicators	42

Executive Summary

Governments have significant purchasing power that can be used to accelerate the transition to a low-carbon economy. Recent international examples demonstrate the potential of this approach: Ireland has introduced requirements for a minimum of 30% clinker replacement and banned the use of the most carbon-intensive cement products in public construction projects, and Canada's Buy Clean policy mandates reporting and reduction of embodied emissions in major construction projects. Successive UK governments have also shown an appetite to reflect decarbonisation objectives in public procurement, but this remains an under-utilised policy in wider industrial decarbonisation and competitiveness policy.

This report, by Cambridge Econometrics for the Aldersgate Group, presents research on the role of public procurement as a demand-side lever to grow markets for low-carbon industrial products, and examines the wider impacts and implementation considerations in the UK. The suitability of public procurement as a policy lever was assessed for different products based on criteria covering current government involvement, economic impact, need for demand-side support from government, and decarbonisation feasibility. The analysis focused on steel, cement, glass, ceramics, plastic, asphalt, paper and aluminium.

Key findings of the research

- The most promising products for low-carbon public procurement are steel, cement and paper. This is due to their relatively high UK domestic production share, relatively high risk of competition from higher carbon imports (carbon leakage) and availability of mature low-carbon alternatives.
- Public procurement can support initial demand for new low-carbon products, catalysing innovation and investment to accelerate cost reductions to be able to compete with higher carbon products. Requirements in public tenders can also improve transparency, data availability and a level playing field for low-carbon products by considering the true cost of emissions.
- Potential economic impacts stem from investment in UK industrial production, supporting jobs and businesses. With UK industry currently struggling with international competition, low-carbon public procurement could be a defensive economic measure and help avoid costly crisis interventions.
- International examples in the US, Canada and the EU offer lessons on different approaches and implementation of low-carbon public procurement. Lack of data internationally and in the UK currently limits the quantitative assessment of the potential economic impact for the UK.
- Clear and consistent policy design is essential for low-carbon public procurement to succeed. This includes outcomes-focused tenders, comparability of carbon content across products, and criteria aligned with broader UK decarbonisation policy, such as grid decarbonisation and industrial strategy.

The interplay between industrial decarbonisation and international competitiveness is complex. Low-carbon public procurement presents an opportunity to stimulate investment in UK industry and can be

more effective than grants by creating a strong demand signal. Risks need to be well understood and evaluated to ensure public procurement is used effectively as part of a wider policy package. For example, UK industry must be able to attract investment to be in a position to meet demand.

Public procurement can act as both a push for UK industry, encouraging incumbents to scale up low-carbon production and a pull for innovation, supporting new entrants and disruptive technologies. To use this lever effectively, the UK government needs a clear understanding of the benefits of public procurement as a policy lever and the sectors it is stimulating. More detailed insights into the size of public procurement for specific products or materials, current UK production capacity, the feasibility of decarbonisation, and export potential would help assess what procurement interventions can realistically achieve and where they are most appropriate.

1 Introduction

Market demand for low-carbon industrial products is nascent but holds significant growth potential. These products are often novel and priced at a premium, limiting their competitiveness with high-carbon alternatives. Demand-side policies, such as low-carbon public procurement, can strengthen the business case for innovation and commercialisation ([Stockholm Environment Institute, 2023](#); [Edler, 2023](#)).

The UK Government's recent consultation, *Growing the market for low carbon industrial products: policy framework* ([DESNZ, 2025](#)), includes proposals to harness the UK's substantial public procurement budget to scale up the market for low-carbon products and accelerate industrial decarbonisation. The UK's public procurement budget amounts to over £300 billion annually, roughly one third of all government spending ([Booth, 2025](#)). Low-carbon public procurement (LCPP) is the strategic process through which governments and public-sector organisations procure goods, services, and works that minimize climate impacts by reducing lifecycle carbon emissions. LCPP can be applied at multiple levels, for example, by requiring reporting and setting an overall whole-life carbon and embodied carbon targets for a public project or by specifying low-carbon performance requirements for particular products or services within that project. The UK government's consultation proposes the development of guidance to help public bodies make informed low-carbon purchasing decisions that send stronger demand signals to the market, support innovation and accelerate commercialisation of low-carbon products and services.

Cambridge Econometrics (CE), in collaboration with and commissioned by the Aldersgate Group, investigated the role that public procurement can play as a demand-side lever, encouraging a market for low-carbon industrial products, and the economic benefits that would arise from such government intervention. There were three elements to the research:

- **Desk-based research** examining the potential for public procurement to stimulate demand for low-carbon industrial products, including analysis of associated economic impacts.
- **Development of a multi-criteria assessment** to evaluate the suitability of industrial products for targeted public procurement.
- **Development of policy recommendations**, in collaboration with the Aldersgate Group, to support the progression and implementation of low-carbon procurement.

This technical report summarises CE's contribution to the research, presents the outcomes of a theory of change assessment, describes the approach, data and assumptions and findings for a multi-criteria assessment of selected industries' potential for low-carbon public procurement, and concludes with key takeaways for policy consideration.

The remainder of the report is structured as follows: Chapter 2 presents the theory of change on the impacts of low-carbon public procurement. Chapter 3 presents the approach applied to identify and assess good candidates (products/industries) for low-carbon public procurement. Finally, Chapter 4 draws conclusions and points to opportunities for future research.

1.1. What are the benefits of low-carbon industrial products?

Low-carbon technologies can deliver wide-ranging environmental, societal, and economic benefits. Low-carbon technologies, which are used to manufacture industrial products, help lower emissions and therefore contribute to preventing climate-related damage. Low-carbon technologies

reduce local air pollution with associated impacts on health, they can generate new employment opportunities while encouraging further investment in low-carbon goods and services. First movers in industrial decarbonisation can gain competitive advantage in international markets, export expertise, and safeguard domestic industries, driving positive innovation spillover effects across the economy (PIIE, 2022; Edler, 2023). Low-carbon production and improved energy and material efficiency can also improve a country's resilience and energy security, particularly in countries who import fossil fuels (Stockholm Environment Institute, 2023).

Low-carbon products are currently not cost-competitive due to market and structural barriers.

Existing infrastructure and supply chains favour carbon-intensive production, creating path dependency. Scaling up low-carbon solutions requires learning-by-doing, but early investment is risky and not yet at scale (PIIE, 2022). Firms may underinvest in R&D for low-carbon technologies due to lower perceived profitability. High upfront costs deter investment, especially for heavy industrial goods. Long-term financial returns and design lifespans of industrial products create lock-in, reducing incentives to invest in new industrial processes for low-carbon alternatives. In addition, incumbent high-carbon technologies have had years of innovation, efficiency, economies of scale to drive down the cost of production.

Market failures necessitate public intervention to support low-carbon industrial products. The social costs of emissions are not reflected in the market price of high-carbon product, resulting in insufficient demand for low-carbon alternatives, underinvestment in industrial decarbonisation. Carbon pricing, while a useful 'pull factor,' is not enough to create a market for low-carbon products due to international competition and carbon leakage. 'Push factors', such as public procurement and mandatory product standards, can incentivise low-carbon production and complement carbon pricing.

1.2. How can low-carbon public procurement support the growth of low-carbon industrial products ?

Public procurement can stimulate innovation and crowds in investment for low-carbon products. Public procurement (PP) is an effective tool for stimulating innovation, especially as low-carbon products are novel and require R&D to reduce production costs. PP fosters innovation, opens new market opportunities, and de-risks investment (OECD, 2024). It can outperform other policy options, such as direct R&D subsidies (Edler, 2007; Chiappinelli et al., 2025), and avoids free-riding issues seen with grants or tax advances: PP encourages the production of low-carbon products, giving confidence to and incentivising the entire industry to shift away from high-carbon production. Public bodies, as the largest single purchasers of several products, can efficiently and credibly achieve strategic targets, crowding in further private investment (Hebous et al., 2019; Xia et al., 2025; Zabala-Iturriagagoitia, 2021). In other words, PP signals to the entire market – both producers and buyers – that there is demand for, and confidence in, low-carbon products.

Low-carbon public procurement (LCPP) can correct market failures and create lead markets. A lead market is where public buying acts as a catalyst, creating strong initial demand for new, innovative products or services and helping the market scale. By valuing low-carbon attributes in tenders, government signals the true social cost of emissions and can demonstrate leadership in purchasing low-carbon products. LCPP encourages producers to invest in cleaner technologies by guaranteeing demand, creating markets and de-risking investment in emerging technologies. Public buyers can set standards and require disclosures, reducing information asymmetry. LCPP also addresses coordination failures along the supply chain (by effectively aligning fragmented actors along the supply chain – producers, suppliers and buyers – towards decarbonisation objectives), which is

essential for systemic decarbonisation. 'Push' and 'pull' factors can complement each other, and there is no one-size-fits-all solution ([PIIE, 2022](#); [IEA, 2022](#)).

The UK currently does not use LCPP for low-carbon industrial products, but initiatives are underway. The UK has taken steps to decarbonise industrial goods and was a co-founder of the Industrial Deep Decarbonisation Initiative at COP26 ([DESNZ, 2025](#); [IDDI, 2025](#)). Commitments exist under the Green Procurement Pledge, but there is no clear central government guidance on procuring goods based on embodied carbon content ([DESNZ, 2025](#)). Industrial goods are difficult to compare based on carbon content due to inconsistent definitions or classification of low-carbon goods and commitments to purchase low-carbon goods are inconsistent. The recent DESNZ consultation on a policy framework to grow the market for low-carbon industrial products explored policies that could address these challenges, including the creation of an Embodied Emissions Reporting Framework, product classifications for embodied emissions and green procurement.

1.3. International examples of LCPP

United States – Buy Clean California Act

California's Buy Clean Act, which came into force in 2017, sets ambitious standards for embodied emissions in public procurement, aiming to drive industry-wide change. California's 'Buy Clean California Act' ([DGS, 2023](#)) requires the consideration of embodied emissions and the global warming potential (GWP) of key construction materials in public projects. The state publishes maximum GWP thresholds for materials, which are progressively lowered over time, sending a strong long-term signal to the market. Products exceeding these thresholds are excluded from tenders, incentivising manufacturers to reduce emissions.

Despite challenges, some impacts can already be observed. Implementation challenges of the Act include delays, the lack of uniform Product Category Rules (PCRs), and limited facility-specific data. Despite these hurdles, the Act has improved transparency and reporting of embodied emissions, although the immediate impacts on emissions have been limited due to narrow coverage and high initial thresholds. Despite these implementation challenges, the policy has inspired similar initiatives in other states and at the federal level. ([DGS, 2023](#))

Canada – Federal Buy Clean Policy

Canada's Buy Clean Policy mandates reporting and reduction of embodied emissions in major construction projects, fostering innovation and accountability. Canada's 'Buy Clean Policy' ([Hasanbeigi et al., 2022](#)) requires compulsory reporting of embodied emissions and whole-building life-cycle assessments (LCAs) for major buildings and infrastructure projects. Starting in 2025, the embodied carbon of structural materials (primarily targeting cement, steel and aluminium) in federal construction projects must be reduced by 30%. These requirements are supported by additional programs and tax incentives aimed at stimulating the production of low-carbon products. The policy emphasises transparency and standardised assessment, encouraging innovation and investment in cleaner technologies.

European Union – National examples

European countries are increasingly integrating environmental criteria into public procurement, with varying approaches and levels of ambition. Several European countries have made the inclusion of environmental and social criteria in public procurement mandatory or are planning to do so ([Stockholm Environment Institute, 2023](#)). For example:

- Italy and Spain require environmental criteria and/or social criteria in tenders to be considered, France is planning to introduce it, too. The ultimate goal is to find the tenderer with the best quality-price ratio instead of lowest price (Spain) and consider environmental and social aspects (France, Italy, Sweden).
- Germany uses the Blue Angel ecolabel in procurements and sustainability assessments for buildings. The Blue Angel ecolabel is awarded to products and services that meet strict environmental and health standards; and federal authorities are committed to sourcing products with the German Blue Angel ecolabel, wherever possible.
- France and Catalonia already set non-binding targets to increase the share of public tenders where social and/or environmental criteria are evaluated.
- Sweden mandates reporting of embodied emissions: all construction companies state the climate impact of all new buildings and Life Cycle Assessment is needed for road projects above a value of €5 million.

Ireland has introduced requirements for the use of recycled materials and consideration of embodied emissions. Procured paper and textile products should be 100% and at least 20% recycled, respectively. For **cement and construction projects** in Ireland ([DECC](#), 2024; [GOV IE](#), n.d.) public guidance includes a minimum of 30% of clinker replacement and the ban on the use of the most carbon-intensive cement products (CEM I). There is also a requirement to produce whole life-cycle GHG assessments in infrastructure and building projects.

EU-level

The EU has introduced ambitious legislation to create lead markets for net-zero technologies and strengthen industrial resilience. The Clean Industrial Deal (CID) was launched in February 2025 and aims to make decarbonisation a driver of competitiveness and growth across the EU. This includes proposals for the **Industrial Accelerator Act** which, if and when it is adopted, will include stronger demand signals for low-carbon **industrial** products with interventions such as labels, public procurement incentives, sustainability criteria and minimum EU content rules ([European Commission](#), 2025; [European Parliament](#), 2026).

The Net Zero Industrial Act (NZIA) focuses on scaling clean energy technology supply chains and is not aimed at heavy industry. However, it provides an example of how the EU is considering public procurement as a lever. The NZIA sets a binding target for 40% of annual deployment needs for strategic net-zero technologies to be met by domestic manufacturing by 2030. This includes technologies such as solar PV, wind turbines, batteries, heat pumps, and carbon capture systems but many of these technologies will also include industrial products such as steel, aluminium and glass. To achieve this domestic content target, the NZIA requires that at least 30% of tender evaluation criteria for public procurement be non-price-based, focusing on factors like sustainability, resilience, cybersecurity, and timely delivery ([European Commission](#), 2024a). This approach ensures that procurement decisions do not rely solely on cost but also reward environmental and strategic value.

The NZIA introduces Net Zero Acceleration Valleys to cluster industries and attract investment (under development). These valleys aim to create regional hubs for clean technology manufacturing, facilitating cooperation between Member States and private investors ([CEP](#), 2024). They provide streamlined permitting processes, access to funding, and infrastructure support to accelerate industrial transformation. By concentrating resources and expertise, these valleys are expected to reduce costs, foster innovation, and strengthen supply chains for critical technologies ([CEP](#), 2024).

The European Critical Raw Materials Act (ECRMA) complements NZIA by securing supply chains for essential inputs. The ECRMA ([European Commission, 2024b](#)) sets clear targets for extraction, processing, and recycling of critical raw materials within the EU and empowers the Commission to establish rules for environmental footprint. By 2030, at least 10% of annual consumption of strategic raw materials must come from domestic extraction, 40% of processing capacities, and 25% of recycling capacities should be in the EU. No more than 65% of EU's annual needs of each strategic raw material at any relevant stage of processing should come from a single third country. These measures aim to reduce dependency on imports, mitigate geopolitical risks, and ensure that the EU can meet its decarbonization and circular economy goals without supply disruptions. ([European Commission, 2024b](#))

Tender criteria under EU initiatives apply equally to all bidders, ensuring compliance with free-trade rules while promoting sustainability. Rather than imposing direct subsidies, the EU focuses on regulatory measures and market creation. Public procurement rules under NZIA and ECRMA require bidders to demonstrate compliance with environmental standards and resilience criteria, creating a level playing field while incentivising innovation. In many tender points, European businesses can demonstrate an advantage (e.g., embodied emissions, resilience, social sustainability).

EU-level policies are designed to complement national initiatives and create systemic change. EU legislation provides a harmonised framework, but Member States implement their own green procurement strategies. EU-level programmes do not provide subsidies or tax advantages but focus on regulation and national implementation – as a result, Member States may spend more on public procurement to foster innovation and may support local R&D further. The ultimate goal for the EU is to reduce reliance on imports, enhance competitiveness, and secure high-value jobs in strategic sectors.

Impact of existing LCPP policies

Policies aim to create lead markets, improve comparability, and drive industry-wide transformation. California and Canada's main goal is to create lead markets, leveraging the public sector's purchasing power to influence entire industries. Standardised life-cycle assessments and product comparability are central to reducing information asymmetry and encouraging investment in emissions reductions and resource efficiency. The ripple effect of these policies is evident, with other states and federal initiatives (e.g., the Inflation Reduction Act, Federal Buy Clean Initiative) adopting similar approaches. The Californian Buy Clean Act has notably improved transparency and reporting, though immediate emission reductions are limited by the scope of materials and data availability. In the EU, different nations prioritise quality-price ratios, environmental and social aspects, and embodied emissions. EU-wide policies aim to reduce reliance on imports, increase resilience, and support cooperation between Member States, focusing on regulation and market creation rather than fiscal incentives.

Quantitative evidence on economic impacts is emerging but remains limited due to the novelty and complexity of these policies. While there is anecdotal evidence and some impact assessments (e.g., for California), comprehensive data on investment crowding-in, procurement changes, and long-term shifts in domestic production are still being collected. The Canadian policy is too recent for robust outcome data, and EU-level initiatives are not yet fully in force. Nonetheless, these examples demonstrate a range of approaches taken to LCPP and show how LCPP policy design can incorporate a range of outcomes including stimulating domestic production, supply chain security and social aspects.

1.4. Theory of change – what are the potential economic impacts of LCPP?

This section explores the transformative potential of LCPP in driving industrial change and economic growth. It examines how LCPP policies can generate demand for innovative low-carbon products, attract new investments, and bolster the competitiveness of UK industry in the global marketplace. Central to this is a theory of change assessment, which sets out the pathways through which public procurement can stimulate market development, reduce costs, and encourage widespread adoption of cleaner technologies.

Creating lead markets

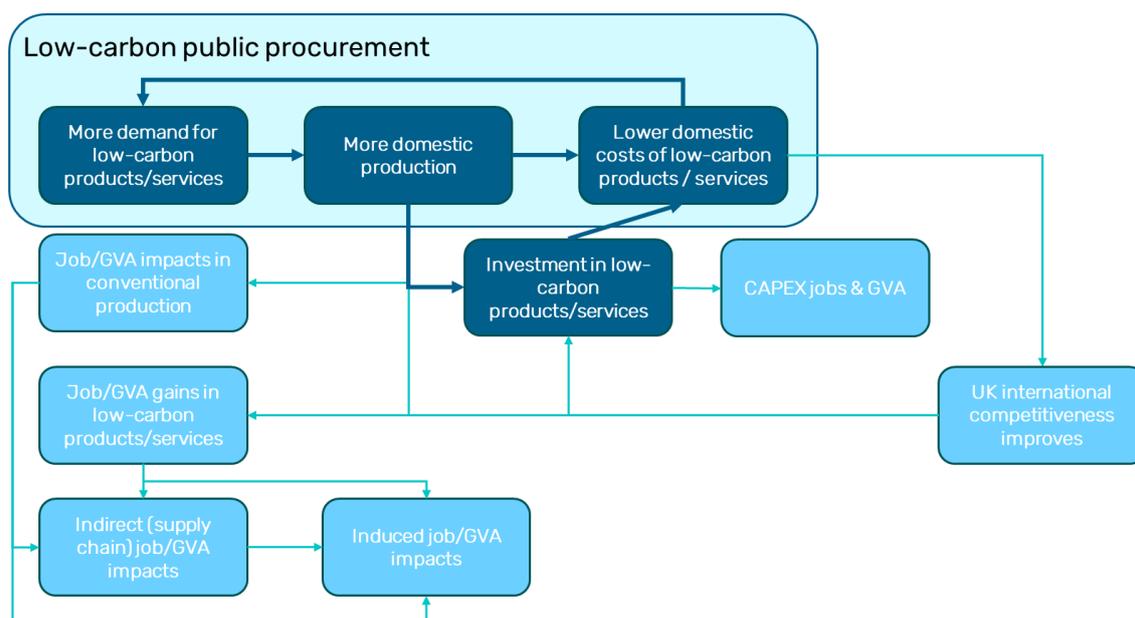


Figure 1: Theory of change - how public procurement can create lead markets

Note(s): The theory of change diagram illustrates the potential impacts and pathways of a public procurement intervention. In each subsection, a specific impact channel is highlighted - these are shown with dark blue boxes and arrows.

Low-carbon public procurement creates demand for innovative products and accelerates cost reductions. The theory of change underpinning LCPP is straightforward: by guaranteeing demand for low-carbon products, public procurement signals to firms that innovative products will have a market. This reduces uncertainty and incentivises businesses to invest in scaling up production. Increased output drives down unit costs through economies of scale and learning-by-doing, reducing the green premium and making low-carbon alternatives competitive over time (as illustrated in Figure 1). This dynamic is critical because early-stage technologies often face high costs and market barriers. Procurement acts as a ‘push factor’, complementing carbon pricing and other ‘pull factors’, ensuring that low-carbon products can reach commercial viability faster.

As an indirect impact, LCPP lowers the price of low-carbon products over time. The increase in production brings costs down as low-carbon production scales. There is an increase in investment into low-carbon production, which amplifies cost reductions through economies of scale and learning-by-doing. The reduction in the green premium can incentivise private businesses—and more public bodies—to purchase low-carbon products, further stimulating domestic production. Public bodies also

benefit from a declining green premium over time, making procurement more cost-effective in the long run.

Crowding in investment

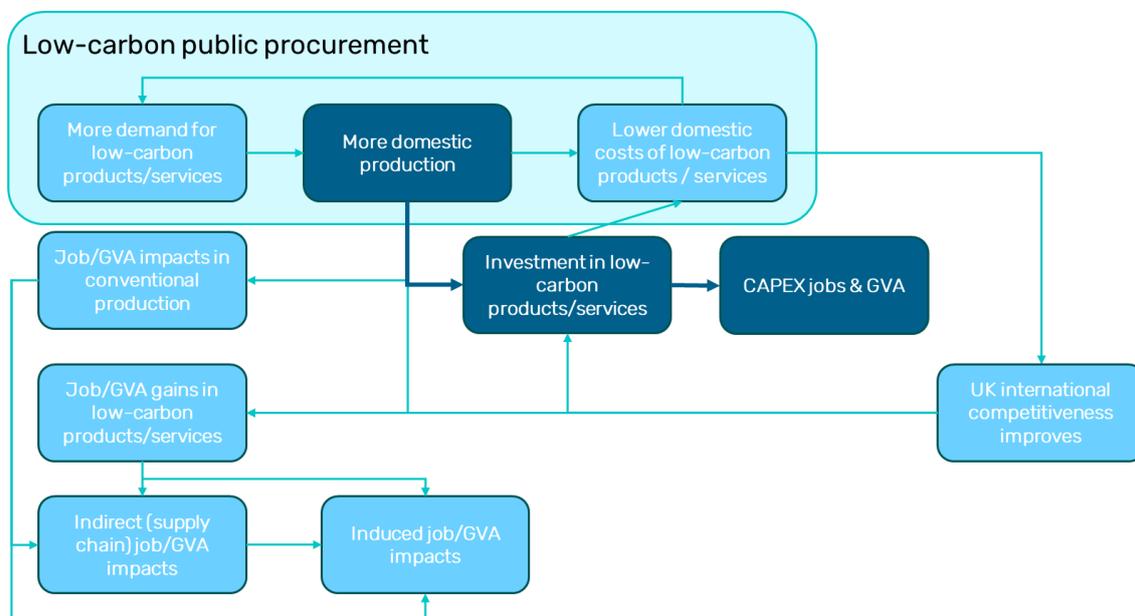


Figure 2: Theory of change - how public procurement can crowd in investment

Capital investment in low-carbon production generates significant economic benefits. LCPP stimulates CAPEX-heavy investments in new production units or retrofitting existing facilities. These investments have direct impacts on employment and gross value added (GVA), creating jobs in both high-skilled R&D and low-skilled construction (see Figure 2 for the impact pathway). For example, building new electric arc furnaces or hydrogen-based steel plants requires substantial upfront capital, which drives activity across engineering, construction, and equipment manufacturing.

The net impacts on GVA and employment remain uncertain. Operational costs associated with low-carbon production may be lower than those of conventional products, particularly when raw material and energy inputs are reduced or when low-carbon processes require less labour. Consequently, the overall net effect *could* be negative, depending on the specific low-carbon solution and product involved. It is worth noting that this pathway is focused on employment and GVA related to low-carbon industrial production and does not capture the extent to which potentially negative impacts would be mitigated in the wider economy (e.g. transition of skilled workers to other sectors).

Economy-wide impact of investment

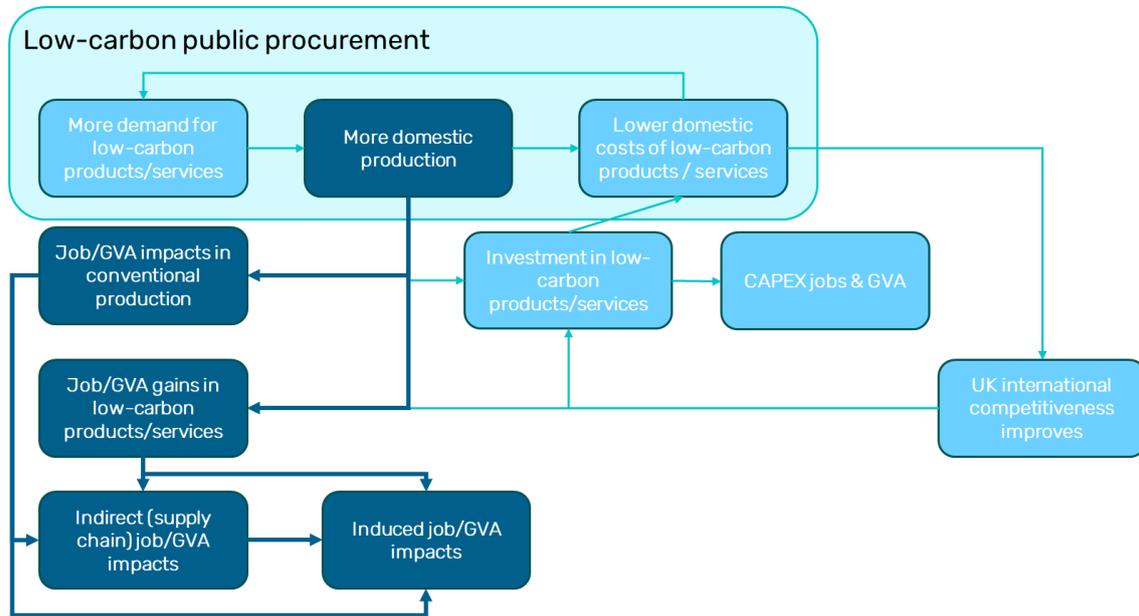


Figure 3: Theory of change - the economy-wide impacts of investment

Indirect and induced effects amplify the benefits across the economy. Investment in low-carbon production triggers supply chain effects, as firms purchase additional goods and services. These indirect impacts ripple through sectors such as engineering, logistics, and raw materials. Induced effects arise when increased wages boost household consumption, further stimulating economic growth and affecting a wide range of products and services. The rise in wages primarily stems from higher labour demand as firms expand production to meet new supply chain needs. These wage gains then circulate through the economy via household spending, reinforcing the induced effects. These impacts are visualised by dark blue in Figure 3.

Increase in competitiveness

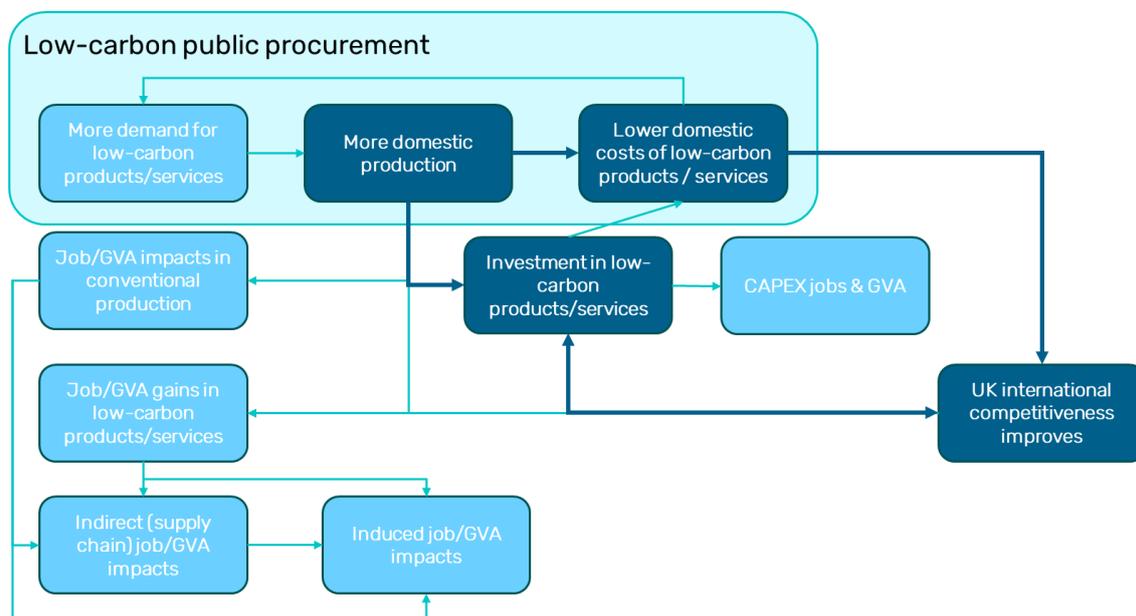


Figure 4: Theory of change - the impact of public procurement on competitiveness

LCPP strengthens competitiveness and resilience in strategic industries. By crowding-in private investment, LCPP can establish the UK as a first mover in low-carbon technologies, thereby facilitating opportunities for exports and advancement within high-value supply chains, as shown in Figure 4. Initial investments have the potential to replicate achievements such as Denmark’s wind energy industry, where proactive policy measures fostered global market leaders (see Box 1).

Box 1: How Denmark became a global leader in wind industry

Denmark is a leading global exporter of high-value-added components in the wind supply chain, having invested early in wind energy and being the first to build offshore wind farms (UNFCCC, 2023).

Exports include:

Wind turbines – Vestas ranks as the largest company after its Chinese competitors, but boasts a more diverse global presence (BloombergNEF, 2025).

Development and operation – Ørsted has shifted from a fossil-fuel-focused utility to a developer and operator specialising in renewable energy, particularly offshore wind (Ørsted, n.d.).

Hundreds of companies operate throughout the **supply chain** (Green Power Denmark, n.d.), which is worth billions of euros (IEA, 2023).

Being a first mover does not ensure the UK will remain competitive in exporting low-carbon products, as other nations may possess advantages including lower labour costs, reduced energy expenses, or less strict regulatory environments. For example, Germany emerged as a global leader in

solar photovoltaic (PV) deployment during the 2000s, driven by supportive policies such as feed-in tariffs. However, in the 2010s, China captured the majority of Germany's market share, primarily through a supply-driven approach. (CLEW, 2017; [The Asianometry Newsletter](#), 2022)

The UK industrial sector currently **lags behind in terms of investment**, leading to ageing assets and infrastructure, and industrial jobs are often relocated abroad ([UK Department for Business and Trade](#), 2024; [UK Department for Business and Trade](#), 2025b). This underinvestment makes the UK vulnerable to cheap imports and the dumping of goods – particularly steel – where significant overcapacities exist in East Asia (see [UK Steel](#), 2024; [UK Trade Remedies Authority](#), 2025; [UK Department for Business and Trade](#), 2025a). With well-targeted policies, such as valuing domestic content share (similar to the US Inflation Reduction Act), the UK can support its own industry and strengthen resilience to imports, which is **critical for infrastructure and defence projects**.

In the global arena, the UK does not have a competitive advantage in producing traditional high-carbon industrial goods: it often relies on imported raw materials and energy carriers (e.g., coke for steel production), while gas and electricity prices remain relatively high and labour costs are also expensive. Therefore, **low-carbon industrial production offers a strategic opportunity to reduce reliance on fossil fuel imports and increase the UK's energy security**, acting as a defensive measure against geopolitical tensions. At the same time, low-carbon products could create a new market in which the UK plays a pivotal role, safeguarding domestic jobs and keeping its industry alive.

1.5. Costs and risks

Low-carbon products may have higher initial costs, but long-term benefits outweigh them.

Public tenders for low-carbon products may cost more initially. This can lead to increased public spending, therefore to higher debt service; it can stimulate inflation, and may lead to more imports ([Bruegel](#), 2025a; [PIIE](#), 2022). Larger businesses may have an advantage in having the capacity to meet requirements, such as reporting emissions ([Bruegel](#), 2025b). Over time, costs of low-carbon alternatives will decrease, benefiting global producers and mitigating future climate damages. Investment preserves industrial jobs and maintains resilience in key industries.

In the long run, the costs of low-carbon alternatives will decline as production scales, helping to overcome path dependency and making these technologies competitive. This is not just a UK benefit—global producers will also gain from reduced prices. A clear example is the solar PV industry: German taxpayers initially supported mass production, enabling China to radically cut manufacturing costs. Today, solar power has the lowest levelised cost of electricity (LCOE), and the entire world benefits from cheap and clean energy. Similarly, investing in low-carbon procurement now creates the conditions for future affordability and widespread adoption.

A key risk to consider is UK industry's ability to invest or attract investment for the transition to low-carbon alternatives. The theory of change outlined above assumes domestic industry is stimulated by the demand signal from public procurement. It will be critical to understand the state of the sector, both incumbents and innovative SMEs, and investor perspectives to tailor policy measures. LCPP on its own may not be a sufficient policy lever and require other policy interventions to support the transition.

The ultimate goal is to mitigate future climate damages by transitioning to a low-carbon industry, delivering benefits for the UK and all other countries. The UK needs to invest in its industry to support its development, increase competitiveness, and maintain production capacity. This approach preserves industrial jobs and strengthens resilience in key sectors. Well-designed policies such as LCPP can simultaneously meet industrial strategy objectives, create and safeguard high-value jobs,

and accelerate decarbonisation—ensuring that short-term costs translate into long-term economic and environmental gains.

The UK must avoid costly last-minute interventions by investing early in low-carbon industry.

The UK is not competitive in producing traditional heavy industrial goods, yet maintaining industrial capacity is critical for the local economy and national resilience. When investment is delayed, government intervention becomes expensive and heavily reliant on grants. Port Talbot is a striking example: this major steel-producing site in South Wales incurred losses of £4 billion over recent decades, prompting its owner, Tata, to announce permanent closure. The decision was triggered by the energy crisis and the urgent need to replace ageing assets, highlighting the risks of reactive policy. Port Talbot is now being transformed into a low-carbon steel production unit at a cost of £1.25 billion, including £0.5 billion in government grants (for more information about the transformation of Port Talbot, see Box 2.) Belated actions like this cost taxpayers far more than proactive strategies (Mohaddes, 2024). Well-designed policy packages, including LCPP, can help crowd in private investment, preserve jobs, and accelerate decarbonisation without repeated government bailouts, ensuring resilience and competitiveness in key industries.

Box 2: Case study of Port Talbot

Port Talbot’s transformation illustrates the opportunities and challenges of industrial decarbonisation.

Port Talbot, a major steel site in South Wales, is shifting from legacy blast-furnace steel-making to a modern electric-arc-furnace (EAF) ‘green steel’ production model (Business New Wales, 2025; Tata Steel, 2025). The new facility will melt scrap steel, reducing reliance on iron ore and coal, and the production of virgin steel has already ended. Once operational, it is expected to produce around 3 million tons of steel annually and cut on-site CO₂ emissions by approximately 90%, reducing UK direct industrial emissions by about 1.5%. This transformation is driven by economic sustainability—the plant reported more than £4 billion in losses over recent decades, and its ageing assets required major investment. Decarbonisation pressure from the UK’s binding net-zero target for 2050 and policy support, including a £0.5 billion government grant within a total investment of £1.25 billion, have accelerated the shift (Business New Wales, 2025; Turley, 2025).

The transition brings both opportunities and challenges. EAF technology aligns with the circular economy by reusing the UK’s surplus scrap steel, which is currently exported, and anchors low-carbon industrial manufacturing in the region. However, EAF operations have very high electricity demand, requiring significant upgrades to the local grid (T&D World, 2025). While the transformation preserves around 5,000 jobs in the long run (MRW, 2025), EAF typically involves lower labour input than blast furnaces, meaning some workers will need to be re-skilled to other jobs (Edge Analytics et al., 2024). Competitive pressure from imports remains a concern, but the move future-proofs the plant and creates long-term opportunities for South Wales. Without this investment, Tata would have permanently closed the site, underscoring how proactive low-carbon strategies can secure industrial resilience and regional employment.

1.6. Policy design considerations for LCPP

Clear and consistent policy design is essential for LCPP to succeed. LCPP alone cannot guarantee that UK industry will produce the demanded low-carbon products—tender requirements play a decisive

role. For example, the scope of embodied emissions in tenders matters: British producers could benefit from the UK's relatively low-carbon electricity grid if scope 2 emissions are included, making them more competitive than producers in countries that have a more carbon intensive electricity grid, such as China or Japan.

Comparability of carbon content across products is critical for fair competition. Ensuring comparability requires an embodied emissions reporting framework. Product classification may further help inform public procurers. The incoming UK Carbon Border Adjustment Mechanism (CBAM) aims to address carbon leakage and should provide greater visibility of the embodied carbon of imported products.

Tender criteria must align with broader UK decarbonisation policies. Procurement rules should reflect progress in grid decarbonisation and the deployment of Carbon Capture, Utilisation and Storage (CCUS) projects. This alignment ensures that reductions in accepted embodied emissions are consistent with national climate objectives and industrial strategy.

Policy design should remain technology-neutral and outcome-driven to accommodate innovation. For example, there are multiple pathways to producing low-carbon steel, including hydrogen-based processes, direct electrolysis of iron ore, and increased recycling of scrap steel via electric arc furnaces. All options currently involve high costs and require deep transformations of industry, infrastructure, and supply chains. Focusing on emissions outcomes rather than prescribing technologies avoids locking in specific solutions and supports flexibility as costs evolve.

LCPP should prioritise strategic industries where PP makes up a substantial proportion of demand and complement other demand-side measures. The UK should focus on sectors critical for national resilience or with strong growth potential, while leveraging complementary policies such as mandatory product standards ([CISL](#), 2023). International examples show the importance of integrated approaches: under the EU's Net Zero Industry Act ([EC](#), 2024a), 40% of annual deployment needs for net-zero technologies must be manufactured within the EU by 2030, and the Industrial Decarbonisation Accelerator Act ([Carbon Gap](#), 2025) will introduce mandatory green criteria for energy-intensive sectors. Similar measures can help the UK future-proof its industrial base while meeting climate goals.

Building on this strategic focus, the next section will explore how to identify the most promising candidates for low-carbon public procurement, outlining key criteria and product examples that can deliver maximum impact.

2 Identification of good candidates for low-carbon public procurement

2.1. Introduction

Low-carbon public procurement (LCPP) can be effective in reducing emissions and promoting the market for low-carbon products when it targets the right products. Identifying suitable products requires an approach that considers multiple dimensions of relevance, such as the public sector's presence in the market, relevant economic aspects or carbon intensity of the sector. To address these complexities, this research involved developing and applying a multi-criteria assessment supported by a scoring matrix. We score each product against each indicator on a scale of 1 to 5, with different scores reflecting varying levels of the attribute in question. This approach provides a way to compare products against each other and to identify products that score well against many indicators. It also highlights products which are potentially less relevant for LCPP. While a scoring matrix visualised as a heatmap makes comparison by criteria easy, it should not be viewed as any objective/prescriptive ranking of products, since the different indicators are often not directly comparable from a suitability standpoint; e.g. some indicators were assessed quantitatively, while others were assessed qualitatively, and the importance of indicators for a successful LCPP policy might vary. Nevertheless, the developed scoring matrix can still bring useful insights into various products' attributes in a public procurement context.

2.2. Products/industries covered in the assessment

An initial list of eight intermediary products was chosen based on their carbon intensity, high public share in the demand for product and other relevant product characteristics.

- **Steel** and **cement** have received substantial policy attention, but they remain challenging to decarbonise because of their reliance on high-temperature processes and chemical reactions.
- Due to their tradability, **glass** and **ceramics** are exposed to carbon leakage. High-temperature processes make them hard to decarbonise.
- **Plastic** is produced in the UK in large volumes. While fossil feedstock is used during manufacturing, its carbon intensity is low.
- **Asphalt mix** is a relatively standard material used in great amounts by public construction projects.
- The **paper** industry has a significant carbon footprint as production is energy-intensive, driven by high thermal energy demand for drying and pulping operations.
- **Aluminium** is a critical material for several industries, but its production is inherently carbon-intensive due to the energy demands of electrolysis and the use of carbon anodes.

2.3. Indicators used in the assessment

Table 1 presents the criteria identified through desk-based research as essential characteristics of suitable candidates for LCPP. The indicators are organised into four categories. The first category, 'Current Government involvement', is particularly important, as limited public sector activity in a given product area would constrain the potential impact of an LCPP policy. The second category, 'Economic impact', considers domestic production and export levels, which are critical for identifying products

that play a central role in the current and future UK economy. As discussed in previous chapters, LCPP can serve as an effective demand-side policy to stimulate markets for low-carbon products. Therefore, indicators within the third category, 'Need for demand-side support', assess whether a large demand side intervention is required to stimulate growth in the market. Finally the fourth category, 'Decarbonisation feasibility', identifies the emissions reduction potential of switching to low-carbon industrial products as well as assessing their technology readiness level (TRL), to ensure that LCPP policies contribute meaningfully to the UK's emissions reduction targets.

Table 1 The list of criteria used in the multi-criteria assessment

Scoring pillar	Criteria	Definition
Current Government involvement	Public procurement size	Measures the share of demand for the product across UK public sector buyers, measured in terms of public procurement as a % of total output (therefore captures relative shares).
	Policy alignment	Assesses how well the product supports current UK government policies, priorities, and strategic objectives.
Economic impact	UK domestic production	The average yearly total turnover across the last three years available (2021-2023).
	Export	The average yearly export value across the last three years available (2022-2024).
Need of demand-side support by Government	Carbon leakage exposure	Assesses the risk that manufacturers of conventional/non-low-carbon product may relocate production abroad to avoid domestic low-carbon requirements.
	Cost difference	Assesses the price gap between conventional (non-low-carbon) and low-carbon version/alternative of the product, considering current market conditions (as of 2025) and scalability.
Decarbonisation feasibility	Ease of emissions monitoring	Assesses whether the conventional/non-low-carbon product can be covered by existing or emerging classification systems and emissions reporting standards.
	Decarbonisation potential	Assesses the extent to which the conventional/non-low-carbon product can be decarbonised through feasible, scalable, and cost-effective technologies.
	Carbon intensity	Measures the amount of direct and indirect greenhouse gas emissions associated with the conventional/non-low-carbon product's lifecycle, including production, use, and disposal.

The indicators were chosen based on desk-based research and economic expertise within the CE team. During the desk-based research special attention was given to the 2023 government

consultation on carbon leakage ([DESNZ and HM Treasury, 2023](#)) and to the current government consultation on *Growing the market for low carbon industrial products* ([DESNZ, 2025](#)). Other accessed sources included government strategy documents, such as The UK's Modern Industrial Strategy ([UK Department for Business and Trade, 2025b](#)) and international organizations' publications.

The scoring assessment followed a dual approach. Some indicators were assessed quantitatively, while others were assessed qualitatively; but scoring of each product against each indicator was carried out on a scale of 1 to 5 for the sake of comparability. Table 2 summarises which indicators were assessed quantitatively/qualitatively, and explains the scales used for the scoring and the meaning of scores by indicator. The qualitative indicators are, by nature, more subjective to assess; the scores for these indicators have been decided based on the relevant evidence sources consulted in the assessment and Cambridge Econometrics' economic expertise. The table collating references in *Chapter 5.2* points to the specific sources that have been used in identifying the final score decided for each product/indicator combination.

Chapter 6 Annex: Calculation of the indicators provides a comprehensive overview of the indicators used to assess products and industries in the context of public procurement, policy alignment, domestic production, export potential, carbon leakage, cost differences, emissions monitoring, decarbonisation potential, and carbon intensity. Each indicator has been carefully selected to capture a distinct aspect of the products' relevance to government objectives, sustainability goals, and market dynamics.

Assessing the role of public procurement in scaling markets for low-carbon industrial products

Table 2 Scale used for the scoring and meaning of scores by indicator

			Score meaning				
Criteria			1	2	3	4	5
Current Government involvement	Public procurement size / market potential	Quantitative	Zero or very low level of public expenditure (direct and indirect) in the given industry / product: 0%- 10%	Low share of public procurement: 10%- 20%	Moderate share of public procurement: 20%- 50%	High share of public procurement: 50%- 75%	Very high share of public procurement: 75%- 100%
	Policy alignment	Qualitative	No decarbonisation strategy exists; sector is absent from government and industrial stakeholders' Net Zero plans or policy frameworks.				Clear, recent, and detailed government strategy exists for sector decarbonisation, with defined targets and funding mechanisms.
Economic impact	UK domestic production	Quantitative	Marginal output compared to UK manufacturing sector (less than 3.1 billion GBP / less than 0.5% of UK manufacturing sector)	Small share: 3.1 - 6.3 billion GBP (i.e., 0.5%- 1% of UK manufacturing sector)	Moderate share: 6.3 - 31.4 billion (i.e., 1%- 5% of UK manufacturing sector)	High share: 31.3 - 62.8 billion GBP (i.e., 5%- 10% of UK manufacturing sector)	Very high output compared to UK manufacturing sector (more than 62.6 billion GBP, i.e., more than 10% of the sector)
	Export	Quantitative	Zero or very low value of export (less than 0.5 billion GBP)	Small value of export: 0.5- 5 billion GBP	Medium value of export: 5- 10 billion GBP	High value of export: 10- 50 billion GBP	Very high value of export (more than 50 billion GBP)
Need of demand-side support by Government	Carbon leakage exposure	Quantitative	Very small risk of carbon leakage: CLI is lower than 0.1	Small risk of carbon leakage: CLI is between 0.1 and 0.19	There is a risk of carbon leakage: CLI is between 0.19 and 0.5	High risk of carbon leakage: CLI is between 0.5 and 2	Very high risk of carbon leakage: CLI is above 2
	Cost difference	Qualitative	Low-carbon alternatives cost the same or only slightly more than conventional products; price gap negligible.				Low-carbon alternatives cost substantially more (e.g., >50% premium), creating major adoption barriers.
Decarbonisation feasibility	Ease of emissions monitoring	Qualitative	No standardized monitoring or reporting frameworks exist; emissions data is fragmented or unreliable.				Sector is fully covered by established standards; emissions can be monitored continuously and verified easily.
	Decarbonisation potential	Qualitative	Few or no feasible pathways exist; technologies are experimental or economically unviable at scale.				Multiple scalable, cost-effective technologies exist that can reduce emissions significantly without compromising performance.
	Carbon intensity	Quantitative	Very low carbon intensity: emissions intensity (EI) is under 1	Low carbon intensity: EI is between 1 and 1.9	Carbon intense production: EI indicator is between 1.9 and 5	High carbon intensity: EI is between 5 and 10	Very high carbon intensity: EI is above 10

2.4. Scoring matrix

Table 3 (below) presents the outcomes of the multi-criteria assessment in a heatmap format. The multi-assessment criteria provides a framework to show how industrial products score against different criteria and outcomes. The table is colour-coded for ease of comprehension; a lower score means that the product performs less well against a specific criterion, while a higher score means the opposite. Overall, the outcome of the scoring matrix suggests that each product performs differently against the different criteria. This enables a better understanding of the trade-offs, as well as potential synergies between products when identifying opportunities for greater public procurement targeted towards one or multiple product categories.

Table 2 (above) explains the scales used for the scoring and the meaning of scores of 1 to 5 by indicator. Generally, higher scores mean better performance with respect to the measured aspect.

Table 4 (below) presents the values behind the given scores for each indicator, with additional comments that provide further details into the methodology.

Table 3 Assessed scores by indicator and product

Criteria		Steel	Cement	Plastics	Glass	Ceramics	Asphalt mix	Paper	Aluminium
Current Government involvement	Public procurement size	1	1	1	1	1	5	2	1
	Policy alignment	5	5	3	4	3	3	3	4
Economic impact	UK domestic production	3	3	4	2	1	1	3	1
	Export	3	1	3	2	1	1	2	2
Need of demand-side support by Government	Carbon leakage exposure	5	5	3	4	5	4	4	5
	Cost difference	3	4	4	3	4	2	2	3
Decarbonisation feasibility	Ease of emissions monitoring	5	5	4	5	5	3	5	5
	Decarbonisation potential	4	2	3	4	2	3	4	3
	Carbon intensity	5	5	1	2	3	1	3	3

Table 4 Background data for quantitatively and qualitatively assessed indicators

	Criteria	Definition	Indicators and notes	Steel	Cement / concrete	Plastics	Glass	Ceramics	Asphalt mix	Paper	Aluminium
Current Government involvement	Public procurement size / market potential	Measures the expected scale of demand for the product across UK public sector buyers.	Estimated direct and indirect public procurement as % of total output in 2022 <i>Note(s): Key sectors used for the estimates, in line with the sectoral classification of the UK Input-Output Analytical Tables.</i>	6%	5%	8%	5%	5%	Close to 100%	17%	5%
	Policy alignment	Assesses how well the product supports current UK government policies, priorities, and strategic objectives.		Steel is included in recent government consultation.	Cement is included in recent government consultation.	Plastics is included in recent government consultation.	Glass is included in recent government consultation, detailed net zero roadmap available.	Ceramics is included in recent government consultation.	Asphalt is included in recent government consultation.	Paper is included in recent government consultation.	Aluminium is recently recognised as a critical material and is included in recent government consultation.
Economic impact	UK domestic production	The extent to which the product is manufactured, assembled, or substantially	Average yearly total turnover between 2021 and 2023 (billion GBP)	11.1	9.3	23.6	4.2	2.6	1.2	14.1	1.2

Assessing the role of public procurement in scaling markets for low-carbon industrial products

Criteria	Definition	Indicators and notes	Steel	Cement / concrete	Plastics	Glass	Ceramics	Asphalt mix	Paper	Aluminium
	transformed within the UK.		24.1 Manufacture of basic iron and steel and of ferro-alloys AND 24.2. Manufacture of tubes, pipes, hollow profiles and related fittings, of steel AND 24.3. Manufacture of other products of first processing of steel	23.51 Manufacture of cement AND 23.6 Manufacture of articles of concrete, cement and plaster	22.2 Manufacture of plastic products	23.1 Manufacture of glass and glass products	23.2. Manufacture of refractory products AND 23.3. Manufacture of clay building materials AND 23.4. Manufacture of other porcelain and ceramic products	This is a maximum estimate - total turnover of 23.99 Manufacture of other non-metallic mineral products not elsewhere classified.	17 Manufacture of paper and paper products	24.42 Aluminium production
Export	The extent to which the current version of the product can be successfully marketed and sold in international markets.	Average yearly export value between 2022 and 2024 (billion GBP)	6.5	0.1	9.5	1.0	0.4	0.0	2.9	2.6
		Note(s): Key Harmonized System (HS) sectors used for the estimates. Original source used USD; GBP conversion was done using average 2023 exchange rate (0.8042 USD/GBP).	HS 72	HS 2523	HS 70	HS 70	HS 69	HS 2714, 2715	HS 47, 48	HS 76

Assessing the role of public procurement in scaling markets for low-carbon industrial products

	Criteria	Definition	Indicators and notes	Steel	Cement / concrete	Plastics	Glass	Ceramics	Asphalt mix	Paper	Aluminium
Need of demand-side support by Government	Carbon leakage exposure	Assesses the risk that manufacturers of conventional/non-low-carbon product may relocate production abroad to avoid domestic low-carbon requirements.	Carbon Leakage Indicator (CLI) (based on emissions intensity and trade intensity)	8.99	25.26	0.29	0.74	2.02	0.53	0.74	3.26
			<i>Note(s): Key standard industrial classification (SIC) sectors used for the estimates. Within each product group, the subproduct with the highest carbon leakage indicator is included on the Carbon Leakage List (CLL).</i>	24.1 Manufacture of basic iron and steel and of ferro-alloys	23.51 Manufacture of cement	20.16 Manufacture of plastics in primary forms	23.12 Shaping and processing of flat glass	23.31 Manufacture of ceramic tiles and flags	Estimated value - 23.99 Manufacture of other non-metallic mineral products n.e.c.	17.12 Manufacture of paper and paperboard	24.42 Aluminium production
	Cost difference	Assesses the price gap between conventional (non-low-carbon) and low-carbon version/alternative of the product, considering current market conditions (as of 2025) and scalability.		Primary green steel depends on currently immature technologies, but secondary steel is a viable lower emission alternative.	Low-carbon cement depends on currently expensive CCS technology.	Low-carbon plastics – bio-based, recycled, or chemically processed – are significantly more expensive than conventional ones due to high feedstock and scaling costs.	Higher cullet share lowers costs, but low-carbon furnace upgrades are capital-intensive, resulting in a moderate premium.	High kiln temperatures and costly SME retrofits produce significant premiums.	Low-carbon options have only a small premium, can be competitive.	Recycled paper has only a small price premium, although recycling can be limited.	Recycling offers a relatively cheap and viable alternative.

Assessing the role of public procurement in scaling markets for low-carbon industrial products

	Criteria	Definition	Indicators and notes	Steel	Cement / concrete	Plastics	Glass	Ceramics	Asphalt mix	Paper	Aluminium
Decarbonisation potential	Ease of emissions monitoring	Assesses whether the conventional/non-low-carbon product can be covered by existing or emerging classification systems and emissions reporting standards.		Sector is covered by UK ETS – reporting is captured	Sector is covered by UK ETS – reporting is captured	Sector is only partly covered by UK ETS, reporting is partly captured	Sector is covered by UK ETS	Sector is covered by UK ETS – reporting is captured	Not covered by UK ETS, but emission monitoring standards exist.	Sector is covered by UK ETS – reporting is captured	Sector is covered by UK ETS – reporting is captured
	Decarbonisation potential	Assesses the extent to which the conventional/non-low-carbon product can be decarbonised through feasible, scalable, and cost-effective technologies.		Secondary steel is a mature technology with large reduction potential as its share is currently significantly lower in the UK than in the EU.	Cement manufacturing is hard-to-abate, decarbonisation depends on CCS technology. Other technologies offer moderate reduction possibilities.	Recycling offers a partial decarbonisation possibility; full emission reductions depend on carbon capture.	Recycling and electrification offer feasible large scale reduction possibilities.	Decarbonisation is constrained by very high kiln temperatures, small/fragmented producers, and limited availability of alternative fuels or electrification pathways.	Some emissions can be lowered, but fully replacing fossil bitumen is technically difficult and currently uneconomic.	Paper mills can switch much of their energy to low-carbon electricity or biomass, improve energy efficiency, and increase recycling to lower overall emissions significantly.	Aluminium production can be extensively decarbonised with recycling and clean energy, though energy intensity remains a challenge.
	Carbon intensity	Measures the amount of greenhouse gas emissions associated with the conventional/non-low-carbon product's lifecycle, including production, use, and disposal, relative to its function or output.	Sum of direct and indirect emissions intensity calculated for the carbon leakage indicator - emissions per GVA (emissions intensity as calculated by Nera) <i>Note(s): Key standard industrial classification (SIC) sectors used for the estimates. As the products in the source are more granular than those in this analysis, the product with the</i>	16.3	56.3	0.4	1.8	2.1	0.8	2.1	3.3
				24.1 <i>Manufacture of basic iron and steel and of ferro-alloys</i>	23.51 <i>Manufacture of cement</i>	20.16 <i>Manufacture of plastics in primary forms</i>	23.12 <i>Shaping and processing of flat glass</i>	23.31 <i>Manufacture of ceramic tiles and flags</i>	Estimated value - 23.99 <i>Manufacture of other non-metallic mineral products n.e.c.</i>	17.12 <i>Manufacture of paper and paperboard</i>	24.42 <i>Aluminium production</i>

Assessing the role of public procurement in scaling markets
for low-carbon industrial products

	Criteria	Definition	Indicators and notes	Steel	Cement / concrete	Plastics	Glass	Ceramics	Asphalt mix	Paper	Aluminium
			<i>highest carbon leakage indicator was considered on its own (not necessarily the same product as that with the highest emission intensity).</i>								

Note(s): Sources used for the qualitatively assessed indicators (Policy alignment, Cost difference, Ease of emissions monitoring and Decarbonisation potential) are listed in Table 5 in the Appendix.

2.5. Assessment of scoring outcomes and deep-dives into the most relevant products

Product-level assessment

This subsection aims to describe the takeaways from the multi-criteria assessment, based on Table 3 and Table 4, and to compare products against key assessment criteria. As the assessment of the indicators applied a mixed quantitative-qualitative approach, in which all the indicators were assessed on a scoring scale of 1 to 5, but with scores measuring different things for each indicator, no ultimate 'overall' or 'average' score can be assigned to the products. Nevertheless, the products can be compared with one another within each individual dimension.

Overall, steel and cement achieve relatively high scores across *most* of the assessed indicators, making them the most promising candidates for low-carbon public procurement among the products analysed. In contrast, Asphalt mix and Ceramics products score relatively low across most indicators, making them the least attractive options within the selected product group.

Steel represents a leading option for low-carbon public procurement among the analysed products. Domestic production in the UK is substantial, exceeding £11 billion in 2023, with exports valued at over £6 billion. While steel manufacturing remains carbon-intensive, several decarbonisation methods are available, including cost-effective re-use of scrap iron and emerging technologies such as hydrogen-based processes, which are currently more expensive. Due to its high carbon intensity and global tradability, steel is particularly vulnerable to carbon leakage, warranting targeted policy intervention. Decarbonising steel aligns closely with the UK's policy framework; sector-wide decarbonisation measures and protections against cheap imports – especially from East Asia – are well-referenced in official documents. Although the overall public procurement of steel is not large, various government entities are significant purchasers, providing them with the capacity to influence the market.

Cement receives multi-criteria assessment scores similar to steel, making it another strong option for low-carbon public procurement. The UK produces substantial amounts of cement, partly because its heavy weight and low value mean that trading it internationally is costly and difficult. As a result, the volume of cement imported and exported is generally low, although this has shifted to some extent in recent years. Even though cement has a low tradability index, its high carbon intensity leaves it very exposed to carbon leakage risks. While decarbonising the sector aligns well with current policy frameworks, fully decarbonising cement remains particularly difficult: some approaches can reduce its carbon content – an effort incentivised by the inclusion of cement in the UK ETS – but the chemical processes of cement production mean complete decarbonisation relies on carbon capture, utilisation, and storage technologies (CCUS), which are currently immature and expensive. Similar to steel, public procurement does not make up a large share of total cement demand, but various government entities are major individual buyers and therefore hold significant market influence.

Assessed values of **plastic products** are relatively different compared to steel and cement. Plastics are not directly covered as a product under the UK ETS; however, combustion emissions at some plastics manufacturing installations are regulated, while feedstock-related and downstream emissions remain outside the system, which complicates standardised monitoring. Plastics have a relatively low carbon intensity and several decarbonisation options – such as recycling, and less mature technologies like switching to bio-based plastics, or using CCUS technology. Domestic production and exports of plastic are the highest among the products examined, with figures surpassing £23 billion and £9 billion, respectively. The combination of low carbon intensity and high tradability means that plastics are moderately vulnerable to carbon leakage.

Glass and ceramics perform similarly across most indicators. Both sectors are regulated under the UK ETS, ensuring standardised emissions monitoring (although small installations often fall outside of the ETS threshold). Both products have a relatively low public procurement share, of around 5%. Domestic production and exports are relatively small in absolute terms, with glass valued at £4 billion and £1 billion respectively, and ceramics at £2.5 billion and £0.5 billion. Despite their modest industry size and moderate carbon intensity, these materials have a high exposure to carbon leakage because they remain tradable. A major hurdle in decarbonising these industries lies in the need for reaching (very) high temperatures during production – a challenge that electrification or alternative fuels like biomass could address. However, for ceramics, the fragmented nature of the industry can make the transition to low-carbon options difficult, particularly if existing fossil-based installations are still within their planned operational lifespan (hence slightly higher scores in our scoring matrix with regards to the need for demand-side support by the Government).

Asphalt mix differs significantly from other products in several ways. Its public procurement volume is particularly high since most roads are government-maintained. Domestic production is relatively small, at about £1 billion, with almost no exports. Though asphalt has a low emissions intensity, it remains vulnerable to carbon leakage. Emissions reductions are relatively straightforward and planned for the coming years; however, fully decarbonising asphalt is technically challenging due to the difficulty of replacing fossil-based bitumen. Notably, this is the only analysed product whose emissions are not directly covered by the UK ETS, which may present challenges for standardised emissions monitoring.

Generally, **paper** ranks in the middle of the scale. Although its public procurement share is higher than that of many other analysed products, it remains relatively small compared to the overall market. The UK's domestic paper production stands at approximately £14 billion, with nearly £3 billion being exported. Its emissions are regulated under the UK ETS. Paper's carbon intensity is moderate; however, when considered alongside its tradability, the risk of carbon leakage is significant – though still lower than several other products reviewed. Recycling offers a practical way to cut down on raw material use during paper manufacturing, and switching to low-carbon energy sources is also an effective strategy for the industry. Notably, paper production itself mainly generates emissions through energy consumption, not directly from industrial processes.

Aluminium falls in the middle range overall (similar to paper products). It aligns well with current public thinking and is classified as a critical mineral. Despite this, its domestic production, public sector demand, and export value remain relatively low. Aluminium is moderately carbon-intensive but still uses a substantial amount of electricity, making it very energy-intensive. Its risk of carbon leakage is assessed as very high. Decarbonisation efforts can be boosted by increasing aluminium recycling, which can be recycled repeatedly without significant degradation of material properties – unlike paper, which has recycling limits.

Deep-dives into the most relevant products

Steel

Steel remains a critical material for the UK economy, particularly for infrastructure and renewable energy projects. The offshore wind industry alone is projected to require 25 million tonnes of steel by 2050, highlighting its strategic importance ([UK Department for Business and Trade, 2025c](#)). At the same time, the steel sector is responsible for about 15% of UK industrial emissions ([Green Alliance, 2024](#)). This makes decarbonising steel production a key priority for meeting climate targets.

However, the sector faces significant challenges. Steel is highly traded globally, which exposes UK producers to carbon leakage risks, especially given the substantial overcapacity in East Asia.

Decarbonising primary steelmaking is inherently difficult because emissions are generated during chemical reactions. In contrast, secondary steel production offers considerable potential for emissions reduction. The UK has an excess of steel scrap that is currently exported abroad, and using this resource through electric arc furnace technology could substantially cut emissions.

Recent developments illustrate the scale of investment required and the potential benefits. As highlighted in Box 2, the transformation of Port Talbot demonstrates how public support can enable the shift to low-carbon steel production, while also preserving jobs and reducing emissions. International examples also show the policy attention to steel. The Buy Clean California Act includes steel, public projects must consider its embodied emissions.

Public procurement can create lead markets for low-carbon steel by requiring consideration of embodied emissions in construction projects.

Cement

Cement is another priority for low-carbon public procurement due to its significant contribution to industrial emissions and its widespread use in construction. Emissions from cement and concrete amounted to 6.6 MtCO₂e in 2022, representing around 10% of UK industrial emissions ([MPA, 2025b](#)).

Cement is among the best candidates for LCPP. Its score for Export was estimated at 1, as cement has traditionally not been widely traded internationally due to its high weight-to-value ratio. However, recent trends indicate a shift, with imported cement making up roughly one-third of total UK demand in 2024 according to the Mineral Products Association ([MPA, 2025a](#)). This raises the risk of carbon leakage and underscores the need for domestic decarbonisation efforts, and for greater international competitiveness. This also indicates that early action could position the UK as a leader in low-carbon cement exports, enabling it to capitalise on rising global demand for sustainable construction materials.

Similarly to primary steel production, decarbonising cement production is challenging because emissions are generated during chemical processes inherent to manufacturing. While partial reductions are possible through measures such as clinker substitution, achieving large-scale reductions will depend on the deployment of carbon capture and storage (CCS) technology. However, CCS is not yet a mature or widely deployed solution, and its scalability remains uncertain. Nonetheless, a promising development is that a UK facility incorporating CCS is planned to open in North Wales in 2029, that will produce fully decarbonised cement ([Heidelberg Materials, 2025](#)).

International examples also support the case of more sustainable cement. In Ireland, a minimum of 30% clinker replacement is required for publicly procured cement. Clinker replacement – clinker being the most carbon intensive particle of cement – allows for significant emissions reductions across the economy.

3 Conclusion

This technical report provided a comprehensive overview of the analysis Cambridge Econometrics carried out to assess the role public procurement can play in accelerating industrial decarbonisation. In this context, we reviewed products and industries as potential candidates for low-carbon public procurement, and assessed their suitability along a set of carefully selected indicators to capture the products' relevance to government objectives, sustainability goals, and market dynamics.

Sectoral variation, also evidenced by the heterogeneity of scores associated with different products/sectors, requires tailored approaches and needs to be taken into account in designing public procurement strategy. Based on the multi-criteria assessment, factors that seem to be particularly important in selecting products or industries for targeted low-carbon public procurement efforts include the share of demand coming from government, strategic value to the UK economy, and the existence and readiness of the wider supply chain (domestic supply capability or at least a credible plan to develop it).

Steel and cement, both representing critical materials for the economy which are meanwhile challenging to decarbonise, have been evidenced by our assessment to be the most suitable candidates for low-carbon public procurement, with great potential to be targeted by public procurement in industrial decarbonisation efforts. Other materials are also suitable to varying degrees.

Whilst the approach taken intended to capture, to the extent possible, quantifiable metrics, there are other relevant aspects of the assessment which have not been covered but which could be, if the data had been there. Initially, we intended to quantify and model the current and future size of low-carbon public procurement in an input-output modelling framework to capture the supply-chain impacts of public procurement as of today and with forward-looking analysis. This approach, however, was deemed unfeasible given the lack of specific data on public procurement size. If this data were available at a product-, or sector-level, interesting quantitative insights could be drawn with regards to the potential public procurement can have in creating additional economic activity or jobs across the UK economy – this is an area that might be explored by future research efforts.

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The below longlist of evidence sources have been consulted for the scoring assessment. The table presented below points to the specific sources that have been used in identifying the specific final score given to each product/indicator combination.

Table 5: References used for the assessment in Chapter 3

	Criteria		Steel	Cement / concrete	Plastics	Glass	Ceramics	Asphalt mix	Paper	Aluminium
Current Government involvement	Public procurement size / market potential	Quantitative	91, 92	91, 92	91	91	91	26	91	91
	Policy alignment	Qualitative	96	96	96	96, 13	96	96	96	96
Economic impact	UK domestic production	Quantitative	93	93	93	93	93	93	93	93, 30
	Export	Quantitative	94	94	94	94	94	94	94	94
Need of demand-side support by Government	Carbon leakage exposure	Quantitative	95	95	95	95	95	95	95	95
	Cost difference	Qualitative	68, 69	70, 71	72, 73	74, 75	24, 38	76, 77	80, 81	82, 83
Decarbonisation feasibility	Ease of emissions monitoring	Qualitative	97	97	97	97	97	53, 54	97	97
	Decarbonisation potential	Qualitative	1, 2, 3, 4, 60, 61	5, 6, 34, 62	7, 8, 9, 10, 35, 63	11, 12, 13, 64, 23	24, 38	76, 77	42, 43	66, 67
	Carbon intensity	Quantitative	95	95	95	95	95	95	95	95

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5 Annex I: Calculation of the indicators

This Annex provides details on how each of the indicators used in the assessment presented in Chapter 3 were calculated. A definition, the specific sources of data employed, and the methodology applied to generate a robust and transparent scoring system are explained for each indicator. Where relevant, limitations and key caveats of the approach are highlighted, introducing both the strengths and limitations of the metrics presented. These explanations are designed to provide clarity on what each indicator represents, how it is quantified, and the rationale behind the chosen methods.

By systematically describing each indicator, this section aims to equip readers with the context necessary to interpret the results and scoring presented in Chapter 3.

Public procurement size

Assessed indicator: The share of output (within the industry) consumer (directly and indirectly) by the public the government.

Sources used: Key source was UK industry-industry IO table (for the year of [2022](#)). All sources used for the scoring are collated under section [5.2 References used for the assessment presented in Chapter 3](#).

Methodology: The industry-by-industry (I×I) table reflects the *direct* government demand for all SIC level-2 industries in the column 'Final consumption expenditure by government'. Most public spending, however, is directed towards public services such as administration, education, and health, so direct demand for the products examined in this analysis is minimal. Instead, government's indirect demand can be assessed through its use of public services supplied by other industries, represented via the inverse Leontief matrix¹ (i.e., the indirect demand generated by government expenditure). Therefore, both the direct and indirect government expenditures were calculated and compared to the total output of each sector. Table 1 illustrates how different products or sectors are allocated to SIC level-2 categories.

Table A1 Matching products/industries with SIC level-2 industries

Final category name	Matched SIC level 2 sector
Steel	Basic iron and steel
Cement / concrete	Manufacture of cement, lime, plaster and articles of concrete, cement and plaster
Plastics	Rubber and plastic products
Glass	Glass, refractory, clay, other porcelain and ceramic, stone and abrasive
Ceramics	Glass, refractory, clay, other porcelain and ceramic, stone and abrasive
Asphalt mix	Glass, refractory, clay, other porcelain and ceramic, stone and abrasive products
Paper	Paper and paper products
Aluminium	Other basic metals and casting

¹ The Leontief inverse shows the input requirements per unit of final use. It allows the user to calculate the total requirements for products across the economy based on a change in final use.

As some sectors are not represented at SIC level-2, additional assumptions were necessary. For glass, ceramics, and aluminium, it was assumed that the government's impact on these subsectors is similar to its effect on the broader sectors. Regarding asphalt mix, economic intuition indicates that government procurement accounts for nearly 100% of all purchases, since most roads are maintained—either directly or indirectly—by the government.

Interpreting and comparing results: Previous research provided figures on both the absolute value and relative share of public procurement for steel and cement in the UK, which can be compared to the findings from the IxI tables. The [Industrial Deep Decarbonisation](#) (IDD) report estimated the proportion of public procurement within overall procurement using input-output (IO) tables and other sources.

For steel, the report found that the government (excluding devolved administrations) procured approximately £600 million worth of steel in 2021, representing 2.7% of total procurement. When this figure was adjusted based on total UK steel expenditure for that year, it resulted in a final estimate of 9% of steel procurement by value. Our analysis estimated government procurement at £652 million in 2022, accounting for 6% of the steel industry's total output. Regarding cement and concrete, our analysis suggests that government spending could influence 5% of industry output, whereas the IDD report assumed a much higher figure of 24%.

A key methodological difference is that the IDD report relies on construction figures, which estimated the public share of construction demand through a different source. In contrast, the approach used here generates a relatively low value for cement procurement because it does not account for the government's final expenditure—likely because cement (and some steel) is included in the gross fixed capital formation column². However, this column in the IO table does not distinguish between public and private shares. Therefore, our results represent the lower end of potential public procurement size. Despite the differences in the IDD report, our method is robust, as it enables different selected products to be analysed in detail using a consistently applied methodology.

Key caveats: After considering different approaches to scoring, we decided to assign scores based on the relative share of direct and indirect government procurement in the total demand for given product. As an example, according to our calculations public procurement accounts for 6% of total steel demand and 5% for of total cement demand. In contrast, the share for asphalt is close to 100%, as it is almost exclusively used for road projects, which are predominantly publicly funded in the UK.

However, focusing on the relative shares obscures the absolute monetary value of public procurement, which might present a very different picture across products. The rationale for scoring public procurement size based on the relative shares rather than the absolute monetary values is that government action has a greater impact when it represents a larger proportion of the market for the product. Ultimately, the existence of low values for public procurement does not eliminate the product – total procured amount in monetary terms still might be significant.

Policy alignment

Assessed indicator: Assesses how well the product supports current UK government policies, priorities, and strategic objectives.

Sources used: All sources used for the scoring are collated under section 5.2 *References used for the assessment presented in Chapter 3*.

² The GFCF column has a very large demand for the construction sector, which also demands a significant value of from the cement and concrete industry.

Methodology: Policy alignment has been assessed and scored via a systematic desk-based review of available evidence. A score of 5 was given to products which align very well with current UK government policy. A clear, recent and detailed government strategy or inclusion in the recent consultation on low carbon public procurement is a proxy for high policy alignment.

UK domestic production

Assessed indicator: Total turnover, yearly average for the last 3 years available (2021-2023).

Sources used: Key source was Annual Business Survey ([ABS](#)), 2023 Results. All sources used for the scoring are collated under section 5.2 *References used for the assessment presented in Chapter 3*.

Methodology: The ABS provides comprehensive total turnover data (in million GBP) for 4-digit SIC codes. For the products analysed, the most relevant groupings were selected. Table 4 specifies which sector was included in the calculation of total domestic production. Confidentiality limited data availability in some cases – for example, all aluminium values for 2021-2023 were withheld and therefore the average from 2019 and 2020 was used as a proxy.

Key caveats: There can be a change in the future share of import, and therefore in value and amount of domestic production. This can be affected by several factors, including the competitiveness of UK industry (e.g., energy prices, labour and regulatory costs), import prices, UK-based and international carbon prices or a change in the pattern of trade. For example, cement has traditionally not been traded in large quantities, but in recent years, imports of cement to the UK has sharply risen (from 12% in 2008 to 32% in 2024) ([BBC](#), 2025).

Export

Assessed indicator: Average yearly export value for the last three years available (2022-2024).

Sources used: Key source was [WITS](#), further sources used to sense-check results include industry-industry IO table ([2022](#)) and ONS trade dataset ([2025](#)). All sources used for the scoring are collated under section 5.2 *References used for the assessment presented in Chapter 3*.

Methodology: The WITS source offers highly detailed export data in absolute terms, allowing all analysed categories to be matched with one or more of its subcategories. Both the IO table and ONS sources provide export values that are slightly different and less granular but scoring from these sources produces the same results as those derived from WITS. Values were converted to GBP based on the average USD/GBP exchange rate in 2023 (source: [USD to GBP Exchange Rate History for 2023](#)).

Interpretation: We assumed that sectors which currently do not export significant value will likely continue to have similarly low export activity in the future. This is probably due to segmented markets or high trading costs (for instance, cement is heavy and low in value, making it costly to transport). However, this approach does not consider the possibility that early decarbonisation in carbon-intensive industries might offer extra export opportunities.

Key caveats: Although the export value of some products may be low, their export potential can still be high, especially if the UK acts as a first mover. Similarly, the current high value of exports could fall in the future if UK businesses lag behind in innovation. Other factors which can influence export potential include the EU and UK's carbon border adjustment, changes in global demand for lower-carbon products, trade policies (e.g. tariffs) and transportation costs.

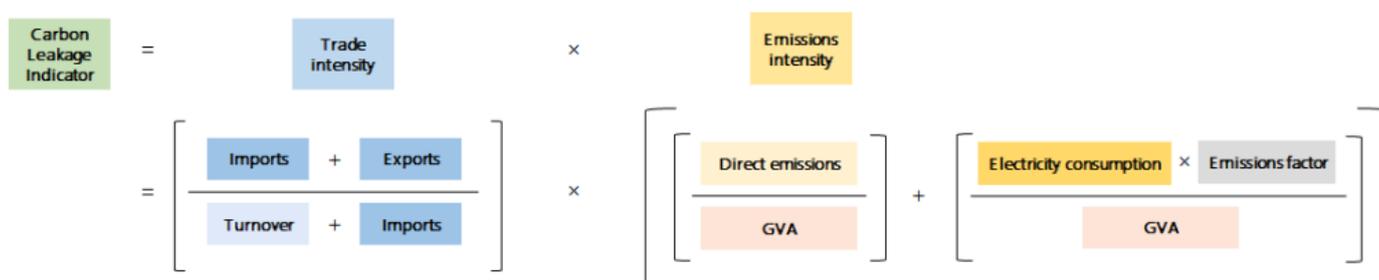
Carbon leakage exposure

Assessed indicator: The carbon leakage exposure indicator considers the carbon intensity and the tradability of a given industry. The more carbon-intensive and tradable products are more exposed to carbon leakage.

Sources used: Key source was Nera, 2024 (prepared for DESNZ). All sources used for the scoring are collated under section 5.2 *References used for the assessment presented in Chapter 3*.

Methodology: Similar to carbon intensity, Appendix A of the Nera source directly reports carbon intensity indicators (CLI). We selected the subproducts with the highest CLIs value to describe the product categories of this analysis. For example, for ceramics, we used '23.31 Manufacture of ceramic tiles and flags', although the ceramic sector includes further sub-products (e.g., '23.2 Manufacture of refractory products').

CLIs is calculated as the product of trade intensity and emissions intensity. It has no unit of measure.



Source: Nera, 2024, Figure 2.1 (p. 4)

Interpretation: This indicator assesses the relationship between product tradability and carbon intensity. All subproducts included in the analysis has at least moderate carbon leakage risk as CLI is higher than 0.19 (which considers 10% trade intensity and 1.9 emissions intensity, assuming 35 GBP/tCO₂ UKA future price). However, the threshold value is sensitive to the carbon price (the Nera source also applies an alternative methodology to lists sub-industries exposed to carbon leakage).

Cost difference

Assessed indicator: Assesses the price gap between conventional (non-low-carbon) and low-carbon version/alternative of the product, considering current market conditions (as of 2025) and scalability. Low scores indicate minimal cost differences, meaning these products do not require additional government support. Conversely, a significant cost gap between traditional products and low-carbon alternatives calls for further measures—such as prioritization in public procurement—resulting in higher scores.

Sources used: All sources used for the scoring are collated under section 5.2 *References used for the assessment presented in Chapter 3*.

Methodology: This indicator has been assessed and scored a systematic desk-based review of available evidence. High scores were given for products that rely on currently expensive technologies for significant decarbonisation. Recycling was considered where applicable (although they are not able to replace the full market); however, products for which low-carbon primary manufacturing is inexpensive and well-established received lower scores.

Cost-effective partial emission reduction possibilities were considered with a smaller weight on the final score than full decarbonisation techniques. For example, the production of low-carbon cement depends on expensive CCS technology but since there are some more cost-effective partial emission reduction possibilities, cement received a score of 4.

Ease of emissions monitoring

Assessed indicator: Assesses whether the conventional/non-low-carbon product can be covered by existing or emerging classification systems and emissions reporting standards.

Sources used: All sources used for the scoring are collated under section 5.2 *References used for the assessment presented in Chapter 3*.

Methodology: This indicator has been assessed and scored a systematic desk-based review of available evidence.

Key caveats: While understanding whether emissions from the production of a given product are easy to monitor is important for identifying suitable candidates for low-carbon public procurement, the concept of “ease of monitoring” is inherently vague and difficult to compare across products. To ensure consistency and comparability, we instead evaluated whether products are covered by the UK ETS. Products within the scope of the UK ETS were assigned a high score. For products outside its coverage, we assessed relevant reporting standards and classification systems. However, worth noting that there is still uncertainty in the definition and measurement of low-carbon products. For example, the German steel industry is still proposing to introduce a standard system to label steel based on their embodied emissions ([WV Stahl](#)). When implementing the ‘Buy Clean California Act’, one of the biggest challenges still includes the assessment of facility-based emissions data ([DGS](#)).

Decarbonisation potential

Assessed indicator: Assesses the extent to which the conventional/non-low-carbon product can be decarbonised through feasible, scalable, and cost-effective technologies.

Sources used: All sources used for the scoring are collated under section 5.2 *References used for the assessment presented in Chapter 3*.

Methodology: This indicator has been assessed and scored a systematic desk-based review of available evidence. Both lower-carbon alternatives and fully decarbonised products were evaluated, with higher scores assigned in cases where full decarbonization was deemed achievable.

Carbon intensity

Assessed indicator: Sum of the direct and indirect emissions intensity as calculated by Nera for DESNZ.

Sources used: Nera, [2024](#) (prepared for DESNZ).

Methodology: Appendix A of the Nera source directly reports Direct and Indirect EI. Direct EI is calculated as direct emissions over GVA, while indirect emissions as [Electricity consumption x Emissions factor] / GVA.

Figure 4.1: Emissions Intensity Formula

$$\text{Emissions intensity} = \left[\frac{\text{Direct emissions}}{\text{GVA}} \right] + \left[\frac{\text{Electricity consumption} \times \text{Emissions factor}}{\text{GVA}} \right]$$

Source: Nera, 2024, Figure 4.1 (p. 15)

Appendix A of the Nera source lists various products, and in our analysis, each product typically contains more subproducts. For consistency with those products analysed under the carbon intensity and carbon leakage exposure indicators, we selected the product with the highest carbon leakage indicators and described its emissions intensity. Although this emissions intensity may not be the highest among all subproducts, we chose to maintain alignment throughout our analysis. In Table 4, notes define which subproduct was used to describe emissions intensity.

Note that the Nera source does not define the unit of measure for emissions intensity in the report or in Appendix A, however, it indicates what emissions intensity can be considered high.