POLICY BRIEF

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Towards chemicals decarbonisation: *EU demand side measures to bridge the green premium*

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1. INTRODUCTION

Energy-intensive industries (EIIs) account for around one-fifth of EU greenhouse-gas (GHG) emissions.[1] Within this group, the chemicals sector occupies a distinctive position. It is the Union's fourth-largest manufacturing industry, with a turnover of €635 million in 2024, supplying essential inputs across almost all industrial value chains (see figure 1).[2] Decarbonisation of the chemicals sector will therefore shape the pace of the bloc's broader industrial transformation.[3]

The sector's emissions stem not only from fossil fuels burned during production, but also from fossil-derived feedstocks. These are chemically incorporated into products and released as greenhouse gases at end of life disposal. Estimates suggest that feedstock-related emissions account for between 60% and over 80% of the sector's total GHG footprint.[4]

Technical solutions for low-carbon chemical production exist, including using bio-based and recycled feedstock and switching from gas-powered to electric furnaces.[5] However, their large-scale deployment is constrained by economic factors. Upstream producers face significant capital expenditure to shift away from fossil-based feedstocks and processes.

Downstream manufacturers must manage higher input costs, compliance costs and administrative complexity.

The central challenge is recovering the green premium: the additional cost associated with producing low-carbon goods. Without predictable demand, the green premium risks becoming a structural barrier to decarbonisation of the chemicals sector rather than a transitional feature. While estimates exist on how the premium could be distributed across value chains, more research is needed to understand real-world distribution mechanisms and their implications for competitiveness. [6]

The European Green Deal established a governance framework to reach climate neutrality by 2050, backed by intermediate emission-reduction targets for 2030 and 2040. The chemicals industry faces growing pressure to reduce its carbon emissions, particularly due to carbon pricing introduced by the EU Emissions Trading System (ETS).

The ETS does not directly price feedstock carbon. However, it creates indirect pressure to shift away from fossil-based inputs, as their processing generates emissions and their embedded carbon is eventually released when products are used or disposed of.

Extended Producer Responsibility (EPR) schemes, already in place for electronics, batteries and packaging, add further pressure by making producers financially responsible for end-of-life product management.[7] While current EPR schemes do not directly price carbon, carbon-footprint declarations are increasingly being considered.[8] The forthcoming Circular Economy Act could further extend EPR requirements.[9] Taken together, ETS and EPR schemes increase the cost of carbon-intensive production, while the market does not yet provide a complementary mechanism to recover those costs through guaranteed demand at viable prices.

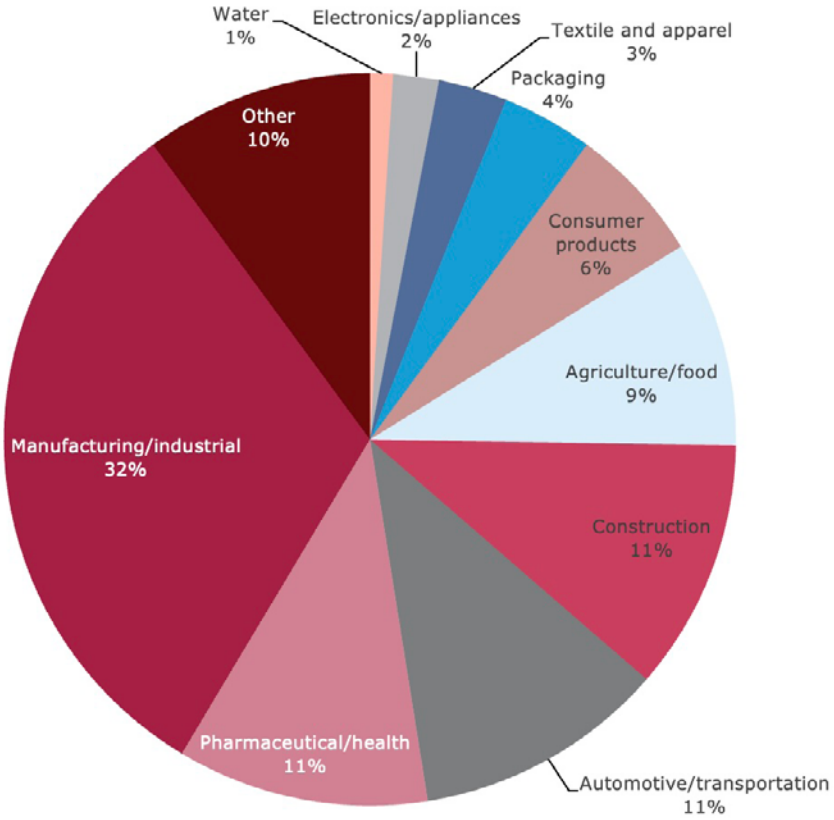
The EU's Clean Industrial Deal (CID) signals a shift towards stronger demand-side industrial policy, including public procurement, amounting to 16% of EU GDP annually,[10] labelling and investments. By strengthening demand for low-carbon products, these measures aim to de-risk investments in cleaner production technologies and help chemicals producers recover the costs of decarbonisation.

However, the fundamental challenge of the green premium persists: without careful design, these instruments risk shifting costs and risks across the value chain rather than resolving them.

EU policy intervention to bridge the green premium is necessary to successfully advance the industrial decarbonisation. Well-designed demand-side instruments are more targeted and time-limited than direct subsidies. They are structured to leverage private capital alongside public funds, which alone are insufficient to finance full decarbonisation.[11] Such policies can unlock investments, create high-skilled employment and strengthen European value chains.

This Policy Brief examines how the EU can accelerate chemicals sector decarbonisation while safeguarding competitiveness through demand-side measures. Adopting a value chain perspective, it puts forward policy recommendations to accelerate decarbonisation in the chemicals sector while preserving the Union's industrial base.

Figure 1: Share of chemicals sales in Europe by end market served



Source: Cefic, The Competitiveness of the European Chemicals Industry, January 2025.

2. BACKGROUND

2.1. The European Green Deal

While the EU has a strong legacy of chemicals legislation prior to the European Green Deal,[12] it did not articulate a clear vision for reducing industrial carbon emissions or the carbon intensity of products. Voluntary and general instruments, such as Product Environmental Footprints[13] and green public procurement criteria, were implemented only to a limited extent and without a clear focus on decarbonising chemicals value chains.[14]

The Green Deal marked a shift in approach, introducing several initiatives with demand-side instruments of relevance to industrial decarbonisation.

The Ecodesign for Sustainable Products Regulation (ESPR) and the Batteries Regulation, for example, envisage the introduction of Digital Product Passports (DPP)[15] to enable the sharing of information on product circularity – including durability, reparability and recycled content of products – across the value chain. DPPs can empower consumers, companies and governments to purchase circular products with a lower carbon footprint. However, requirements on data security, interoperability and governance remain to be specified.[16]

The Net-Zero Industry Act also represents an initial attempt to operationalise public procurement as a demand-side lever for industrial decarbonisation. It complements existing green public procurement criteria by requiring contracting authorities to apply sustainability and resilience criteria to clean technologies.[17] However, these criteria may be set aside if they result in disproportionate costs for member states, while their application to the chemicals sector remains indirect.

2.2. The Clean Industrial Deal as turning point

The 2024 European elections marked a shift towards stronger industrial policy, prioritising closing the innovation gap, decarbonising the economy and reducing dependencies.[18] The Clean Industrial Deal (CID) aims to make investment in industrial decarbonisation financially viable, explicitly recognising the need for "concrete measures on the demand side".[19]

The Chemical Industry Action Plan[20] (CIAP) acknowledges that without guaranteed demand, chemicals producers cannot recover the costs of cleaner production, thereby discouraging investment in low-carbon technologies and non-fossil feedstocks. It also established the Critical Chemicals Alliance, a stakeholder forum, designed to support EU decision-making by mapping risks and guiding investment and policy priorities in the sector.[21]

Despite growing recognition of the role of demand-side measures in incentivising decarbonisation in the chemicals sector, the EU's post 2024 framework still requires operationalisation through concrete regulatory and financial instruments, including the Industrial Accelerator Act (IAA) and the European Competitiveness Fund.

For chemicals, the IAA empowers the Commission to adopt delegated acts introducing incentives for low-carbon chemicals produced in the EU, informed by recommendations from the Critical Chemicals Alliance. The effectiveness of such measures will depend on their capacity to both enable decarbonisation and to ensure that resulting costs can be absorbed across the chemicals value chain.

3. STATE OF PLAY

3.1. Information tools

Recent EU industrial initiatives, including the CID and ESPR, increasingly treat information tools such as labelling and DPPs as mechanisms to stimulate demand for low-carbon and circular products.[22] However, these tools primarily support other policies, rather than create demand themselves.

The IAA is unlikely to introduce new DPP obligations beyond those established under existing product legislation. Instead, it foresees a voluntary, sector-specific low-carbon label for steel based on standardised GHG accounting rules derived from the Carbon Border Adjustment Mechanism (CBAM). If the Commission seeks to extend similar measures to chemicals, which could help drive demand when combined with the right incentives, standardised carbon accounting methodologies are a prerequisite.

Currently, divergent accounting approaches undermine the comparability needed for such labels to function effectively.[23] The Commission's ongoing study, launched in late 2025 to identify potential priority areas for a future ESPR application to chemicals, should prioritise the standardisation of divergent approaches.[24]

Information requirements are also unevenly distributed across the value chain. Upstream producers invest in measurement and verification systems, while downstream companies bear compliance costs related to disclosure and reformulation despite often struggling to access consistent data from suppliers.[25]

Without complementary incentives, such as non-price criteria in public procurement or financial instruments to bridge the green premium, information tools such as DPPs or labelling are unlikely to generate sufficient demand for clean industrial products.

3.2. Public procurement

Public procurement is the main demand-side instrument the Commission is advancing to complement information tools. It is considering making procurement requirements for sustainable and circular products mandatory under product-related legislation[26] and the forthcoming Circular Economy Act,[27] although the precise scope and application to chemicals remain to be determined.

The IAA seeks to create lead markets for low-carbon industrial inputs by introducing mandatory technical specifications for member states in public procurement for steel, aluminium, cement and plastics. The revision of public procurement directives, expected in late 2026, could mainstream non-price critera beyond energy-intensive industries. In parallel, the Critical Chemicals Alliance will assess the potential of public procurement in selected chemical end markets.[28]

However, the demand-pull potential of public procurement for chemicals is more complex than in other sectors. Chemicals are typically intermediate inputs embedded in final goods rather than direct objects of procurement.

The impact therefore varies significantly by subsector, depending on the share of chemical content in final products.[29] Costs are also shared across the value chain, underscoring the need to carefully account for value-chain dynamics when designing procurement requirements (see figure 2).

Public procurement alone may not be enough to drive chemicals sector decarbonisation. In the case of mandatory requirements, higher procurement costs may cause a political backlash while voluntary requirements can result in marginal procurement volumes of low carbon chemicals.[30] Joint procurement mechanisms, in which multiple buyers pool demand, could help address this limitation. A comparable approach is already used for critical raw materials under the Critical Raw Materials Act through the Raw Materials Mechanism.[31]

Figure 2: The complex chemicals value chain

Source: United Nations Environment Programme, Global Chemicals Outlook II - From Legacies to Innovative Solutions: Implementing the 2030 Agenda for Sustainable Development, 2019.

3.3. Investments

The proposed European Competitiveness Fund, with a budget of €409 billion, aims to strengthen strategic technologies that could serve as major purchasers of chemical inputs.[32] By investing in sectors with significant purchasing power, such as automotive, construction and electronics, the ECF could create concentrated, predictable demand for low-carbon chemicals. The fund earmarks €26.2 billion for the clean transition and industrial decarbonisation, potentially fostering downstream markets that reward cleaner chemical production. [33]

However, the ECF's broad sectoral coverage means that decarbonisation of the chemicals sector must compete alongside numerous other industrial priorities. While it would be unrealistic to expect the Fund to focus exclusively on chemicals, its demand-creating potential could be better harnessed through targeted conditionalities. For instance, requiring ECF-funded projects in chemical-intensive sectors to demonstrate commitments to sourcing lower-carbon chemical inputs would translate industrial investment into clearer demand signals for upstream producers.

Without such conditionalities, the ECF risks expanding downstream production capacity while leaving the carbon intensity of chemical inputs unchanged. This would represent a missed opportunity to leverage public investment to generate the predictable demand necessary for chemicals producers to invest in decarbonisation.

3.4. Contracts for difference

Even with information tools, public procurement and investment support, many low-carbon chemicals projects struggle to move beyond the demonstration phase.[34] The core barrier is investment risk: producers face high capital expenditure for relatively immature technologies while lacking certainty that downstream buyers will absorb the green premium associated with decarbonised feedstocks.

Without mechanisms that guarantee demand at viable prices, regulatory pressure – including from the ETS and EPR schemes (see introduction) – risks producing stranded assets rather than accelerating investment in low-carbon alternatives.

Carbon Contracts for Difference (CCfDs) function as long-term delivery contracts between governments and industrial operators. Under existing programmes, primarily at the member state level, they provide a stable carbon price signal by guaranteeing a fixed price per tonne of CO_2 reduced relative to conventional production.[35] As such, they de-risk investment by ensuring that producers can recover decarbonisation costs. If the ETS carbon price falls below the agreed level, the state pays the difference. The forthcoming Industrial Decarbonisation Bank,[36] announced under the Clean Industrial Deal and operating within the European Competitiveness Fund framework, is expected to deploy €100 billion for emission-reduction projects, including through CCfDs.[37]

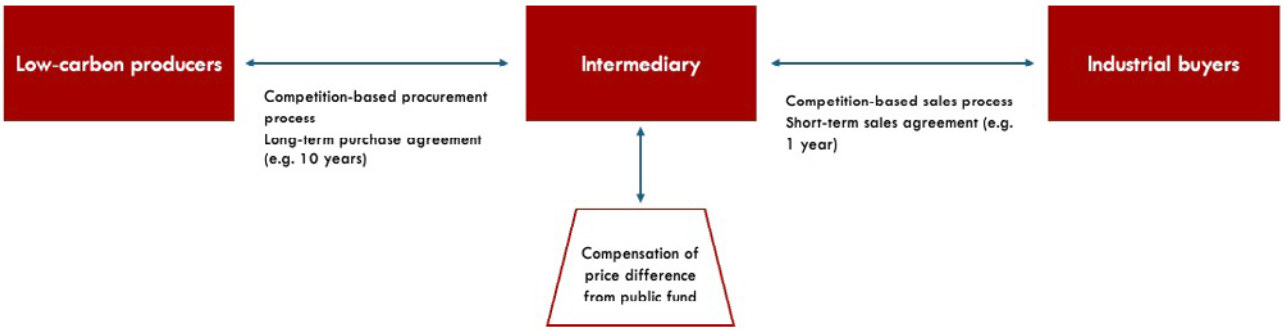
However, CCfDs are best-suited for sectors where ETS-based carbon costs dominate production expenses, such as steel and cement.

For chemicals, a significant cost barrier to decarbonisation lies not in carbon pricing but in the price of alternative feedstocks themselves.[38] Bio-based chemicals are sometimes estimated to be between 1.2 and 4.2 times more expensive than fossil alternatives, due to market conditions rather than carbon prices. [39]

Double-auction contracts for difference offer a more suitable alternative for chemicals. Inspired by Germany's H2Global mechanism for renewable hydrogen, an intermediary could conclude long-term purchase agreements with producers of low-carbon chemicals and resell these to downstream buyers under shorter-term contracts, with public funds covering the price gap.[40] This mechanism would address the market coordination failure: while regulatory pressure from ETS and EPR creates incentives to switch feedstocks, market prices for sustainable alternatives remain prohibitively high for most buyers, and producers lack certainty that demand exists at viable prices.

By providing dual demand certainty – securing long-term purchase commitments for upstream producers to de-risk investment in bio-based or recycled feedstocks, while offering more affordable low-carbon inputs to downstream buyers – double-auction CfDs can help bridge the green premium.[41] However, such mechanisms for chemicals remain at an early stage, and EU institutional frameworks to scale such mechanisms across Europe remain underdeveloped.

Figure 3: Double-auction contracts for difference



Source: Authors' own elaboration, building on Hintco, Factsheet, 2024.

3.5. Taxation/VAT

Other fiscal instruments, such as the forthcoming Green VAT initiative, could help create demand for decarbonised chemicals.[42] The initiative aims to reduce VAT on products containing recycled materials by addressing embedded VAT in second-hand goods. If its scope extends to chemicals products or intermediates made from recycled feedstocks, it would lower costs for downstream buyers, incentivising demand for recycled inputs over carbon-intensive alternatives.

However, the envisaged scope remains limited, leaving uncertainty about whether and how the Green VAT initiative will support the decarbonisation of the chemicals sector.

4. Recommendations

The European chemicals sector faces a fundamental challenge: while decarbonisation technologies exist, the green premium associated with low-carbon production creates a structural barrier to the deployment of low-carbon technologies at scale. Without predictable demand for low-carbon chemicals, producers cannot recover these costs, stalling investment in decarbonised production.

EU policies like the Clean Industrial Deal have increasingly recognised the green premium challenge, signalling a shift to greater emphasis on demand-side measures. Information tools, public procurement, targeted investments, fiscal incentives and contracts for difference together can de-risk decarbonisation investments and create viable markets for low-carbon chemicals. However, these instruments remain fragmented and not yet fully operationalised at the EU level.

The effectiveness of demand-side measures depends on how costs, risks and burdens are distributed along value chains. Without a holistic approach, there is risk of fragmented demand signals that fail to reach upstream producers at sufficient scale, cost asymmetries that concentrate financial pressure on downstream users, and administrative complexity.

To overcome these challenges, the EU should:

Value chain perspective

- **Apply a holistic vision for decarbonisation of the chemicals sector with an aim to ensure proportional distribution of costs across the value chain**. EU demand-side instruments for industrial decarbonisation should be designed around value chain dynamics, rather than individual market segments. In the chemicals sector, where inputs are repeatedly transformed and embedded across value chains, narrowly targeted measures risk misallocating costs and weakening demand signals for upstream chemicals producers. If deployed in isolation, demand-side instruments place a disproportionate burden on either upstream producers or downstream users. This undermines the objective of creating predictable, bankable demand for low-carbon chemicals. An approach that combines multiple instruments within a coherent value chain framework is therefore essential.

Information tools

- **Standardise carbon accounting, communication and data sharing methodologies for chemical products**. The Commission should accelerate the development of a standardised carbon accounting methodology to enable meaningful comparison of carbon intensity across chemical products. It should prioritise this in its ongoing study (see section 3.1) to define potential focus areas for a future ESPR-delegated act on chemicals.
- **Sequence measures according to technical and administrative readiness**. Premature requirements risk imposing compliance costs without generating credible demand where data interoperability or verification systems remain immature.

Public procurement

- **Place the value chain at the core of any extension of mandatory low-carbon technical specifications to chemicals end-markets, whether via an IAA delegated act or the revised Public Procurement Directives**. Clear procurement timelines and targets would strengthen investment certainty. However, as chemicals are embedded in millions of downstream products across complex value chains, a value chain perspective is essential to avoid misallocating costs and distorting demand-signals for upstream producers.

- **Mandate the Critical Chemicals Alliance (CCA) to propose the creation of an EU demand-aggregation platform for low-carbon chemical inputs, to bridge public procurement requirements and private purchasing practices**. Such a platform could consolidate fragmented downstream demand into credible signals for upstream investment. It could facilitate binding commitments by downstream users to minimum volumes of low-carbon chemical inputs ahead of final investment decisions or public tenders . It would also help align public procurement criteria under the IAA and private purchasing practices, reducing fragmentation between public and private markets.

Investments

- **Leverage strategic investments to generate predictable demand for low-carbon chemicals**. The Commission should harness the European Competitiveness Fund 's demand-creating potential through targeted conditionalities, requiring ECF-funded projects in chemical-intensive sectors to demonstrate commitments to sourcing lower-carbon chemical inputs. The Commission should also introduce a prioritisation framework with transparent criteria to guide ECF support. For chemicals, this could focus on molecules with high emissions impact, technological maturity and strategic relevance for European value chains.

Contracts for difference (CfDs)

- **Deploy CCfDs to reduce carbon emissions from the chemicals industry.** While carbon feedstock costs outweigh ETS-related costs in many chemical production processes, CCfDs remain relevant for specific segments where ETS costs represent a significant share of the green premium. These include chemical production processes that rely on energy-intensive heating, such as replacing gas-powered with electric furnaces. Member states should offer such contracts to companies where appropriate, guaranteeing a fixed price per tonne of CO_2 reduced compared with conventional production.

- **Pilot double-auction CfDs to incentivise the uptake of low carbon chemicals.** The Commission should test double-auction CfDs for chemicals value chains, building on Germany's H2Global model. Anchoring these pilots within the Industrial Decarbonisation Bank would help create scalable lead markets for low-carbon chemicals.

Taxation/VAT

• **Consider applying the upcoming Green VAT initiative to chemicals**. The Commission should clarify the scope of the forthcoming Green VAT initiative and potentially extend it to chemical products made from recycled feedstocks in order to incentivise their uptake over more carbon-intensive alternatives.

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