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Carbon Contracts for Difference (CCfDs) as an instrument of choice

Bridging the funding gap for EU Energy Intensive Industries (EIIs)

November 2024

Executive summary

Accelerate the transition to net-zero while enhancing competitiveness

President Ursula von der Leyen's political guidelines for the new European Commission (2024–2029) and the Mission letters to the new EU Commissioners aim to prioritize steps to accelerate the transition towards a low-carbon, circular, competitive and resilient EU industrial base.[1] The prioritization of the transition of the industrial sector emphasizes the need to continue reducing carbon emissions while enhancing global competitiveness, particularly by capitalizing on the potential of clean energy technologies and services markets.

To achieve these objectives, the EU's Energy-Intensive Industries (EIIs), which include key sectors such as chemicals, basic metals, non-metallic minerals (ceramics, glass, and cement), plastics, and pulp and paper, will play a pivotal role. This presents a significant opportunity for EIIs, which over the past few decades have experienced a decline in competitiveness, driven by a combination of high energy prices (exacerbated by the 2022 energy crisis), high feedstock prices, increased carbon emissions costs, funding shortfalls, policy unpredictability and regulatory complexity. As a result, the sector has experienced substantial losses in output potential, a downturn in domestic production and increased reliance on imports, leading to early signs of deindustrialization in certain areas.

While tackling these issues will require a reduction in energy costs, the deployment of infrastructure and reforms, **funding shortfalls for EIIs in net-zero projects can be addressed through Carbon Contracts for Difference (CCfDs).** This paper argues that CCfDs could be a key instrument for mobilizing capital by de-risking private investment for EIIs in net-zero projects.

Funding challenges for the transition

Funding is critical in order for the transition to be effective. The EU's Communication on a 2040 Climate Target estimates that almost EUR 500 billion in annual private investment will be necessary for the low-carbon transition in the EIIs from 2025 to 2040.[2] However, to date, the high costs and relatively unproven nature of net-zero technologies have deterred investment amidst declining competitiveness. Despite the availability of multiple public funding sources at both the EU level and at the Member State level, in our experience, funding for the transition in EIIs in the EU has inadequately addressed market entry, remained fragmented and complex to navigate, and been primarily capital expenditure (CAPEX) -focused.

In July 2024, von der Leyen announced a Clean Industrial Deal to support industrial decarbonization and enhance competitiveness. This policy package, supported by the **Industrial Decarbonization Accelerator Act** and a new **European Competitiveness Fund**, will focus on assisting EU industries in their decarbonization efforts while increasing global competitiveness. The package will include key initiatives to unlock investment, create lead markets for the development, production and diffusion of clean energy technologies in industry, and accelerate related planning, tendering and permitting processes.

CCfDs can help unlock funding and de-risk investments for net-zero projects

CCfDs are a market-based funding mechanism designed to support both capital CAPEX and operating (OPEX) expenditure for companies pursuing net-zero technologies. CCfDs are a subset of Contracts for Difference (CFDs) which specifically focus on the price of carbon. CCfDs are typically awarded through competitive auctions, and provide financial assistance for the difference in costs between traditional fossil fuel technologies and innovative net-zero alternatives, contingent upon carbon price fluctuations. CCfDs therefore serve as both a market-based hedging instrument and an investment subsidy solution. The funding instrument enhances the bankability of capital-intensive projects, improves long-term investment security and efficiently allocates public resources through competitive bidding. CCfDs can create lead markets for net-zero technologies, thereby effectively driving demand for net-zero technologies and products. The EU has explored in the past the potential implementation of CCfDs, although no EU-wide CCfD schemes exist.[3]

Deploying CCfDs at the EU-level

The paper provides an overview of how CCfDs are currently deployed in Germany and the Netherlands. It goes on to explore the opportunities and risks associated with the implementation of CCfDs in the EU more widely, through three distinct approaches: at the EU level, at the national level and in an hybrid approach similar to the Auctions-as-a-Service mechanism under the European Hydrogen Bank or the Important Projects of Common European Interest (IPCEI) scheme; and across four categories: economic efficiency and internal market integrity, governance, political and economic influence, and administrative factors.

While each approach presents advantages and disadvantages, our analysis concludes that establishing a CCfD scheme at the EU level as a central element of a comprehensive industrial transformation policy is the most attractive option to support both industrial decarbonization and increased competitiveness. A hybrid approach funded by Member States could however serve as a fallback option.

As EIIs review potential investments in new technologies to meet their 2030 and post-2030 emission targets, they should consider whether and to what extent CCfDs could change the economics of the investment opportunities. Understanding the mechanics of the instruments and how they might be deployed in the EU is critical to this analysis. EIIs can contribute to the design and successful implementation of CCfDs in the EU.

The paper recommends practical actions that EIIs can take to contribute to the effective implementation of CCfDs in the EU. In particular, EIIs can engage proactively with policymakers, to explain the benefits of CCfDs to their businesses, and to contribute to CCfD program design. For example, EIIs could support policymakers in defining the objectives and scope of the CCfD, develop guidelines, ensure flexibility mechanisms are integrated and launch pilot projects to test the CCfD mechanism on a smaller scale before full implementation.

Declining competitiveness: the state of EU's energy-intensive industries (EIIs)

EU Competitiveness objectives and the role of EIIs

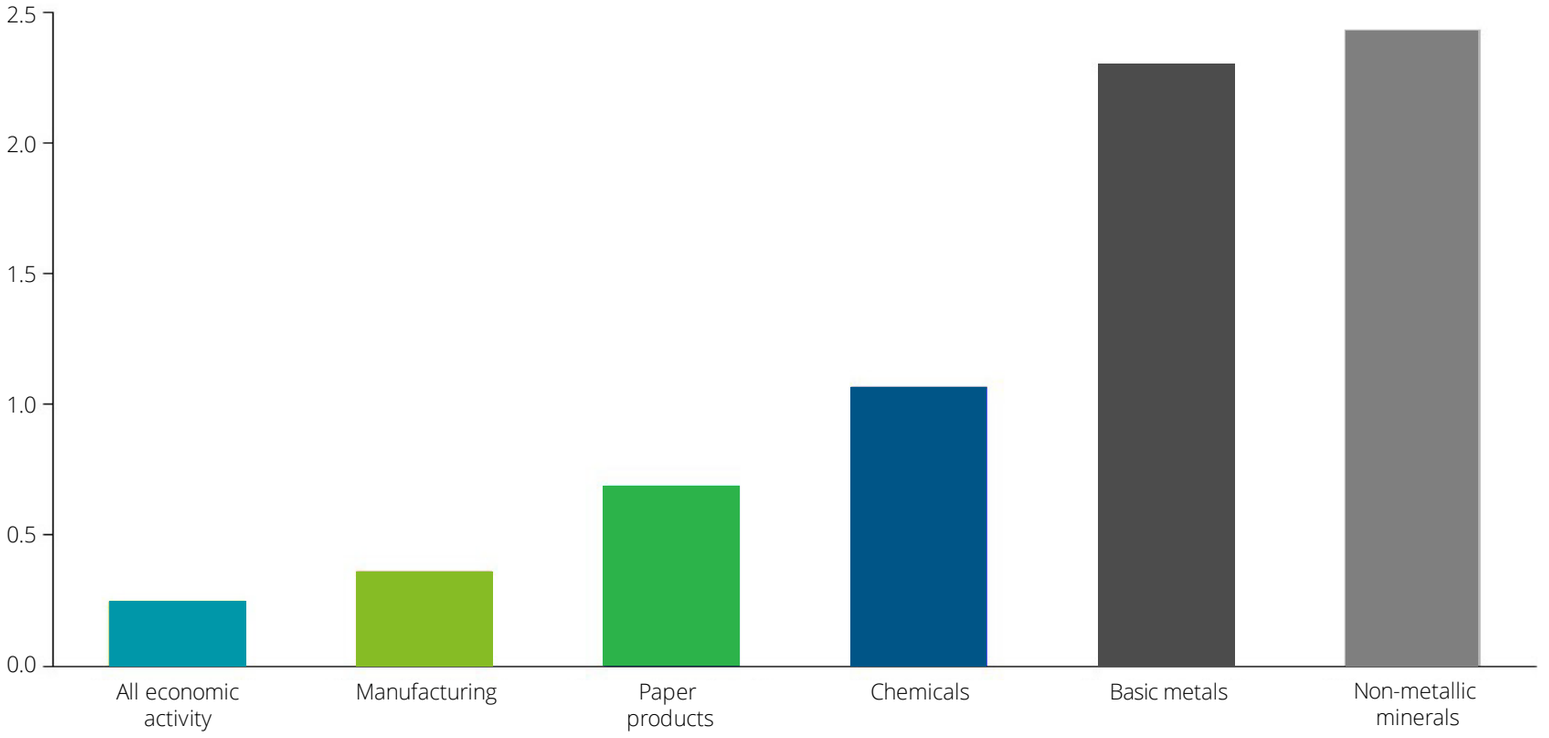
President Ursula von der Leyen's political guidelines for the new European Commission (2024–2029) and the Mission letters to the new EU Commissioners aim to prioritize steps to accelerate the transition towards a low-carbon, circular, competitive and resilient EU industrial base.[4] The prioritization of the transition of the industrial sector emphasizes the need to continue reducing carbon emissions while enhancing global competitiveness, particularly by capitalizing on the potential of clean energy technologies and services markets.

To achieve these objectives, EIIs in the EU, which include key sectors such as chemicals, basic metals, non-metallic minerals (ceramics, glass, and cement), plastics, and pulp and paper, **will play a pivotal role**. Characterized by high energy and "hard-to-abate" production processes (carbon emissions are comparatively difficult to reduce using current technologies—see Figure 1), **EIIs** contribute directly and indirectly to the production of goods and infrastructure that **drive employment, innovation, and economic output in Europe** (see Figure 2), while also helping reduce strategic dependencies.

However, over the past few decades, **EIIs in the EU have experienced a decline in competitiveness**, particularly exacerbated by the 2022 energy crisis. This decline has led to significant output losses, a heightened reliance on imports and a reduction in domestic production. Deindustrialization in the EU in some of these sectors has already started.[5] Consequently, the sector has faced lower export performance and costly disruptions in production capacity, jeopardizing long-term industry competencies and infrastructure.

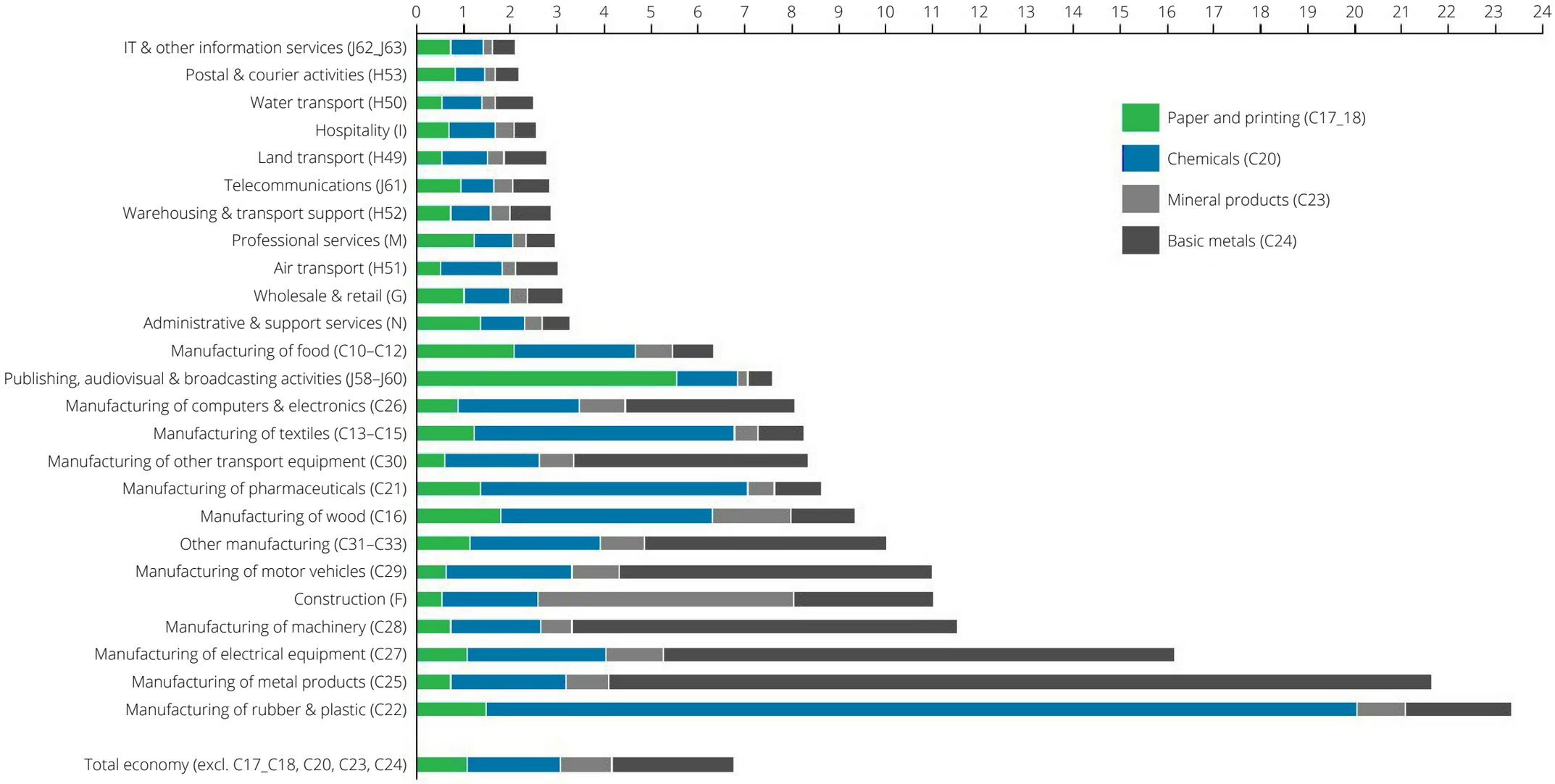
Figure 1. Comparison of the emission intensity of EIIs[6]

Kg of GHG-equivalent per EUR of value added (2021)



Source: European Commission, 2024. Based on Eurostat, 2024 (data from 2021).

Figure 2. Reliance on EIIs inputs in industry production (% total production per industry, 2018)[7]

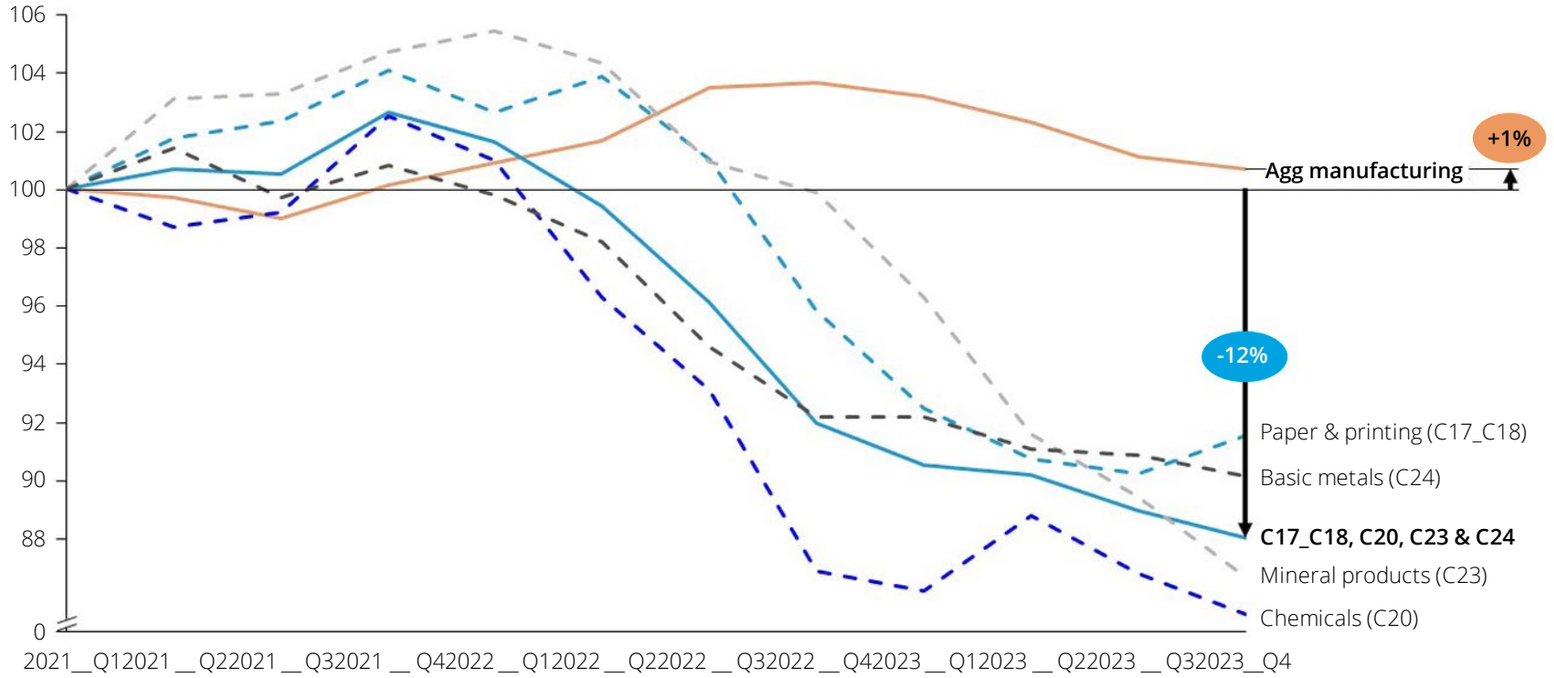


Note: The graph displays each industry's use (direct and indirect) of paper and printing (C17_18), chemicals (C20), non-metal minerals (C23), and basic metals (C24) as inputs relative to total production in the respective industries. C17, C18, C20, C23, and C24 are omitted from the figure as intra-industry exposure is generally strong.

Source: European Commission, 2024. Based on OECD, 2021.

Figure 3. EU production in energy-intensive industries[8]

Indexed, 2021Q1 = 100 (at constant prices)



Source: European Commission, 2024. Based on Eurostat, 2024.

The recent report published by Mario Draghi[9] clearly outlines **the root causes of the competitiveness gap facing the EU's EIIs**:

1. **High energy and feedstocks prices**: EIIs are badly affected by the structural high prices of electricity and fossil fuels (particularity natural gas), which serve as both energy sources and feedstocks inputs in their production processes. The recently adopted Reform of the Electricity Market Design seeks to address some of these challenges by providing more security and flexibility for electricity supply and demand.
2. **High carbon emissions costs**: High emissions costs stemming from the EU's carbon pricing under the Emissions Trading System (ETS) increase production expenses for EIIs due to their substantial carbon intensity. Although free allowances have helped alleviate this burden to date, the scheduled phase-out of these allowances by 2035 threatens to increase costs significantly for EIIs. The definitive application of the Carbon Border Adjustment Mechanism (CBAM) from2026 will be an important instrument for EU EIIs to remain competitive against international peers facing lower or no carbon prices.[10]
3. **Funding gaps and policy unpredictability**: Decarbonizing EIIs requires massive investment in emission-abatement technologies such as electric arc furnaces, clean hydrogen, carbon capture storage and utilization, and raw material recycling, but many of these investments lack a clear business case due to high upfront costs and operational uncertainties. For example, for the four largest EIIs (chemicals, basic metals, non-metallic minerals and paper), decarbonization costs are expected to be approximately EUR 500 billion over the next 15 years.[11]
4. While ETS revenues present a potential funding source, current support remains insufficient to meet the significant investment needs, and the risk of delocalization persists as industries face higher costs in Europe compared to global competitors. The long investment cycles and policy unpredictability further complicate decarbonization efforts, underscoring the need for stronger funding and regulatory support.
5. **An unlevel playing field and complex regulation**: EIIs face significant challenges due to diverging global decarbonization objectives, complex regulations, and uneven financial support compared to international competitors, which can lead to carbon leakage and diminished competitiveness. High trade volumes, increasing non-tariff restrictions, and lengthy permitting processes further complicate the funding and implementation of necessary emission-abatement technologies for these industries. The recently adopted Net-Zero Industry Act (NZIA) will help address these challenges by establishing a harmonized and streamlined regulatory framework for permit-granting processes and providing the opportunity for projects to receive strategic status.

Incorporating competitiveness into EU decarbonization policies is essential to align with the funding initiatives of major economies such as the United States and China. For example, the **US Inflation Reduction Act** (IRA) allocates approximately EUR 5.3 billion in grants to support the installation of advanced technologies in EIIs aimed at reducing emissions. Additionally, the IRA seeks to mobilize over EUR 330 billion in funding by 2032 through tax credits for investments in manufacturing facilities that produce clean energy equipment.[12] This tax credit system is designed to provide a more streamlined and accessible funding route compared to traditional grant allocations. Similarly, the **Chinese government**, as part of its latest Five-Year Plan, is prioritizing subsidies for net-zero innovation and manufacturing, announcing investments exceeding EUR 260 billion in net-zero technologies.[13]

Public funding: A hurdle for a low-carbon, circular, competitive, and resilient transition in energy-intensive industries

Funding challenges for EIIs

Despite the availability of **multiple public funding sources at both the EU level** (such as the Recovery and Resilience Facility (RRF), InvestEU, the Innovation Fund, Horizon Europe, the Modernisation Fund, the LIFE program, and the Social Climate Fund) and at the **Member State level** (through initiatives such as Important Projects of Common European Interest (IPCEIs) and traditional State aid), **funding for the transition of EIIs** in the EU **does not adequately address market entry, remains fragmented and complex** to navigate and **is primarily CAPEX-focused**.

Public funding at the EU level

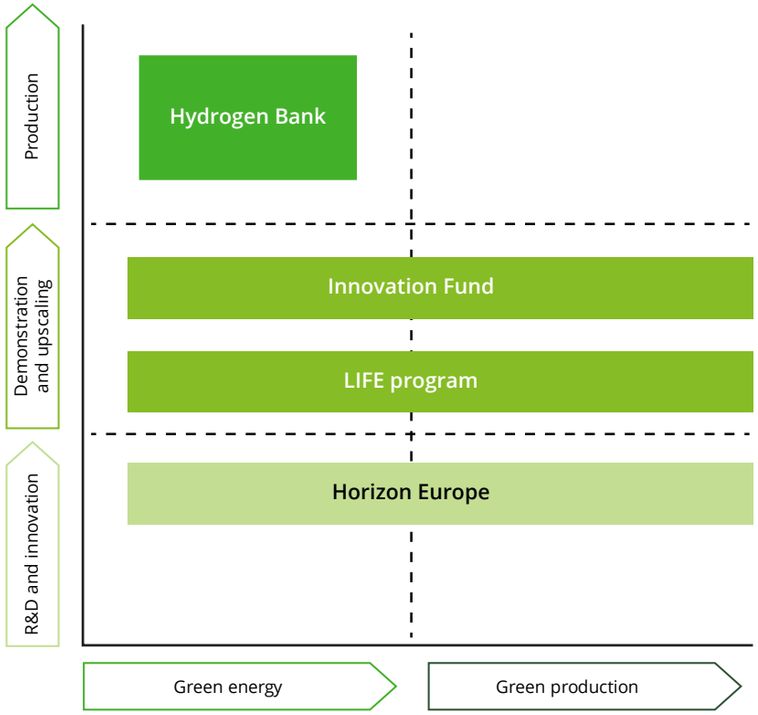
Most EU funding programs tend to exclude projects in the near-production and market-entry stages of innovative low-carbon technologies. They primarily focus on research and development (e.g., Horizon Europe), as well as demonstration projects (e.g., the LIFE program and the Innovation Fund), often without targeting specific sectors within the industrial value chain (e.g., the Modernisation Fund and the Social Climate Fund).[14] **The only program that supports market entry projects is the EU Hydrogen Bank**, which allocated EUR 800 million in its first round of auctions in April 2024.[15] Additionally, available EU funding comes with varying requirements and application rules, often incentivizing only specific innovative segments of the value chain. Furthermore, **operational cost** (OPEX) funding **is frequently excluded from EU support mechanisms**, and support is contingent upon a lengthy, case-by-case evaluation of investment projects and associated costs.

Public funding at the national level

National public funding for net-zero projects in the EU is currently **fragmented and inconsistent.** The EU's budget amounts to over 1% of the EU's GDP, while Member State budgets collectively amount to approximately 50%, and access to EU funding is complex and the private sector.[16]

Furthermore, decarbonization projects are the most difficult to implement in EU Member States and EU regions.[17] This results in disparities in funding availability, leading to unequal opportunities for countries and their associated EIIs to pursue ambitious decarbonization goals. As a consequence, numerous regions are left without the necessary resources to implement net-zero projects effectively.

Figure 4. EU funding programs



Source: Deloitte analysis.

A new approach for unlocking funding for a low-carbon, circular, competitive, and resilient transition in energy-intensive industries is needed.

Bridging the cost gap between net-zero and traditional fossil fuel-based processes

The EU's 2040 Climate Target Plan estimates that approximately **EUR 500 billion in investment will be needed for the low-carbon transition** in the chemicals, basic metals (iron and steel), non-metallic minerals (ceramics, glass, and cement), and paper industries **between 2025 and 2040**. However, the significantly higher costs of net-zero technologies for decarbonizing EIIs compared to traditional fossil fuel-based production processes discourage industrial actors from pursuing these major projects, especially given the deteriorating competitiveness of European industrial manufacturers in the global market. As highlighted in our recent Deloitte report, attracting the necessary investment in emission-abatement technologies will first require de-risking these projects by bridging the cost gap between net-zero and fossil fuel-based alternatives. **Smart and targeted public funding will play a crucial role** in this process by providing the support needed to mitigate business risks, thereby attracting the level of private investment required and facilitating faster final investment decisions (FIDs).

New EU approach to funding the transition

In July 2024, European Commission President Ursula von der Leyen embraced this new approach to funding the transition to low-carbon, circular, competitive, and resilient EIIs with the announcement of a **Clean Industrial Deal** within the first 100 days of her new mandate. This forthcoming policy package, supported by the **Industrial Decarbonization Accelerator Act** and a new **European Competitiveness Fund**, will focus on assisting EU industries in their decarbonization efforts while increasing global competitiveness. Key initiatives will include unlocking investment, creating lead markets for the development, production, and diffusion of clean energy technologies in industry, and accelerating related planning, tendering, and permitting processes. This policy announcement aligns with the vision of key EU industrial players who signed the "**Antwerp Declaration for a European Industrial Deal**," calling for an "European Industrial Deal" to be central to the new European Strategic Agenda for 2024–2029.[18]

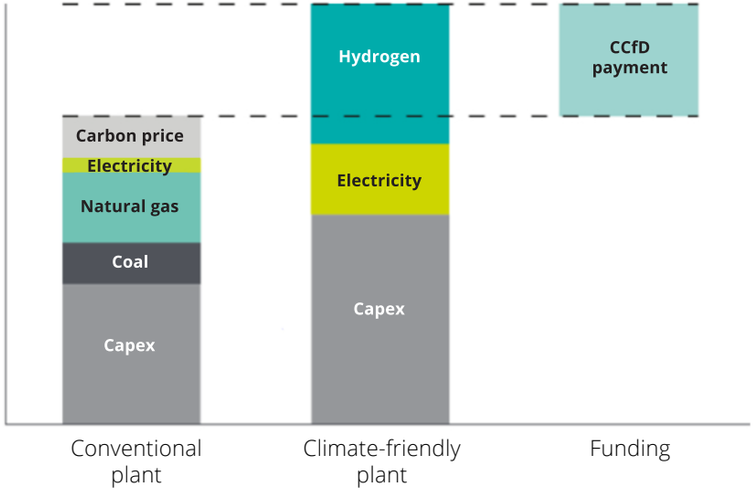
To support these ambitious goals, implementing innovative financial mechanisms, complementary to existing EU and state level funding programs, will be crucial to de-risk private investment in the deployment of net-zero technologies and processes in EIIs.

CCfDs as an instrument of choice to de-risk private investment by energy-intensive industries in net-zero projects

What Carbon Contracts for Difference (CCfD) are and how they work

CCfDs are a market-based funding mechanism, able to support both capital (CAPEX) and operating (OPEX) expenses. CCfDs are a subset of Contracts for Difference (CFDs) which specifically focus on the price of carbon. CCfDs are typically awarded through **competitive auctions**, and can offer companies the possibility of securing investments for net-zero technologies by receiving **funding for the differential costs between high-emission conventional fossil-based technologies and the more costly innovative net-zero technologies, after factoring in carbon price.**

Figure 5. Stylized illustration of CCfD support—Cost components of companies



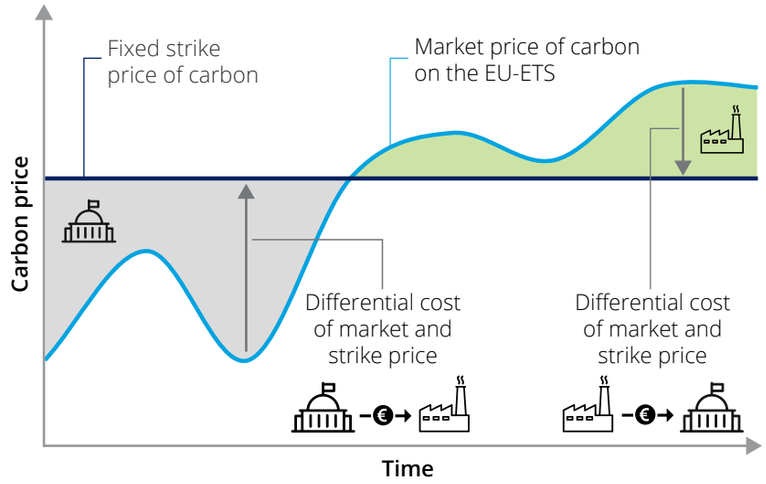
Source: Deloitte analysis, based on BMWK (2023).[19]

The key element of CCfDs is the **fixed strike price** to remunerate companies for their emissions reductions. This can be measured as emission savings per tonne of material produced during a period of time. CCfDs can be developed in two ways:

- **Two-sided**. The company receives a payment based on the differential cost if the market price of carbon falls below the strike price. Any surplus revenue would need to be paid by the company to the regulatory authority if the market price of carbon exceeds the strike price. See Figure 6.
- **One-sided**. The company receives a payment if the carbon price is below the strike price. The company can keep any excess revenues if it exceeds it.[20]

The CCfD instrument is ideally suited for initiating net-zero projects that start with high strike prices, which can gradually decrease as economies of scale are achieved. This approach not only alleviates long-term dependency on subsidies but can also facilitate crucial early-stage investments in net-zero technologies in EIIs.[21]

Figure 6. Graphic presentation of two-sided CCfD mechanism



Source: Deloitte.

"[CCfDs]...would help companies to decarbonize while simultaneously launching industry investments and technological innovation."[22]

—Robert Habeck, Germany's Minister for Economic Affairs and Climate Action

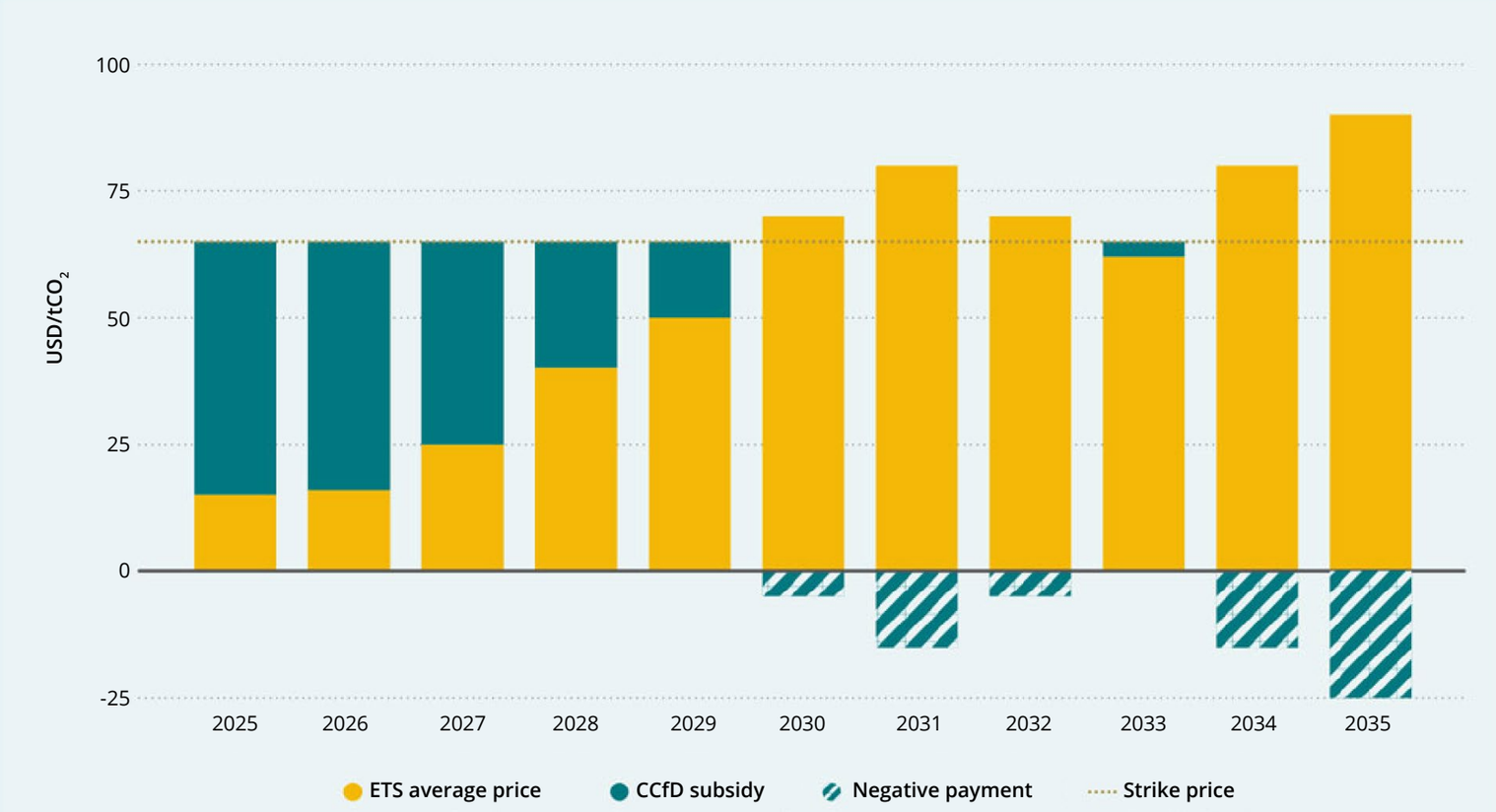
Advantages of CCfDs to help EIIs deploy net-zero projects

CCfDs can facilitate the deployment of net-zero projects in EIIs by serving as a **tailored market-based hedging instrument** combined with an **investment subsidy solution**. This dual approach can **effectively drive demand for net-zero technologies and products**.

A tailored market-based hedging instrument

- **Complementing the EU-ETS scheme**. Abatement costs for EIIs are today typically higher than the carbon price set by the EU ETS. Consequently, the bid price for EIIs is likely to exceed the average CO_2 price on EU ETS market, requiring subsidies to unlock critical investments. CCfDs can bridge the gap between fluctuating, lower carbon prices and a higher, fixed strike price, ensuring the long-term viability of net-zero projects. Over time, as carbon prices rise, CCfD payouts should decrease, potentially reaching zero or even generating negative net costs before the end of the contract period (see Figure 7).
- **Increasing bankability and bridging funding gaps**. By guaranteeing a fixed price per tonne of avoided CO_2 emissions, CCfDs offer financial predictability, reducing the risks associated with investments in net-zero technologies. This stability enhances the bankability of capital-intensive projects, making it easier to secure funding and bridge existing financing gaps in the green transition.
- **Providing long-term investment security**. EIIs are characterized by long investment cycles, often spanning several decades, requiring sustained investment security to attract private capital for these complex, capital-intensive net-zero projects. CCfDs offer stability by locking in carbon pricing over the contract duration, shielding investors from risks such as policy shifts or changes in government commitments. This certainty is crucial in encouraging the long-term investments needed to transition to net-zero.

Figure 7. Example to illustrate the relationship between ETS price and CCfD subsidy at a strike price of USD 65/tCO$_2$



Notes: CCfD = carbon contracts for difference; ETS = Emissions Trading System.

Source: IRENA 2022.[23]

An investment subsidy solution

- **Providing EIIs-targeted support**. By setting industry-specific maximum target prices, CCfD auctions can be tailored to reflect the unique characteristics of each sector, such as capital expenditure (CAPEX) requirements and the "green premium" associated with low-carbon technologies, ensuring that support is aligned with the needs of each industry.
- **An efficient allocation of public resources**. By distributing CCfDs through competitive auctions, EIIs would be incentivized to bid at the lowest possible differential costs, as overstating their funding needs reduces their chances of securing a contract. This competitive process encourages bidders to reveal their true financing gap, ensuring more efficient allocation of resources. Additionally, by disbursing funds only after decarbonization milestones are met, CCfDs reduce the verification costs typically associated with direct grants, which often provide funding upfront without guarantees of performance.

An effective tool to drive demand for net-zero technologies and products

- **Creation of lead markets for these net-zero materials**. CCfDs tackle the "chicken or egg" problem where low supply of net-zero materials hinders demand, and low demand discourages supply. By offering financial support and stabilizing carbon prices, CCfDs help establish lead markets for net-zero materials, facilitating their integration into downstream value chains for products and infrastructure, thereby accelerating adoption across various industries.

Current implementation of CCfDs by EU Member States

The EU has explored in the past the potential implementation of CCfDs, although no EU-wide CCfD schemes exist. For example, the EU considered CCfDs as part of its 2020 Industrial Strategy and subsequently in a proposal to review the EU ETS Directive.[24] Despite not having an EU-wide CCfD program, there seems to be industry support for it. For instance, in a consultation conducted by the EU Commission, almost 85% of the respondents considered that the introduction of CCfDs would create an incentive for industries to decarbonize by removing financial uncertainty.[25]

As of November 2024, both the **Netherlands** and **Germany** have implemented CCfD schemes. In the Netherlands, the **SDE++ program** operates as a subsidy instrument that functions as both a CfD and a CCfD scheme. Initially focused on renewable energy production (SDE+ from 2011 to 2019), the program expanded in 2020 to support projects aimed at reducing CO_2 emissions, including carbon capture and storage (CCS) initiatives.[26] Meanwhile, Germany's CCfD program (**Klimaschutzverträge)**, launched in March 2024, seeks to stimulate investment in net-zero projects, such as for instance hydrogen production plants and pipelines. The first bidding round is now completed. Fifteen companies will receive support under the first round of the program, while approximately 130 companies have shown interest in its second round.[27] Additionally, regional initiatives are emerging, such as a program being launched by the **Flemish government in Belgium**.

Table 1 summarizes the key characteristics of the German CCfD and the Dutch CCfD-like schemes, highlighting their similarities and differences. Overall, the German contracts prioritize large-scale GHG reductions in industrial plants through a two-sided CCfD model, while the Dutch SDE++ program emphasizes renewable energy and low-carbon technologies using a one-sided approach. The German scheme may potentially provide a an answer for financing net-zero technologies in the EIIs, as it takes into account the EU-ETS carbon price, focuses on facilitating net-zero production, and covers both CAPEX and OPEX.

Table 1. Comparison of the German CCfD and the Dutch CCfD-like schemes

Characteristics	German Klimaschutzverträge	Dutch SDE++
Allocated funding	EUR 23 billion in 2024	EUR 11,5 billion in 2024
Contract duration	15 years	12–15 years
Signing parties	Federal Republic of Germany and companies	Dutch Ministry of Economic Affairs and Climate Policy and companies
Tender design	Project-specific	Project-specific
Contract type	Two-sided CCfD	One-sided CCfD
Scope	Companies aiming to operate large-scale plants (> 10 kt CO_2eq). Technologies must emit less than 90% of GHG, as compared to conventional technologies	Renewable energy production and low-carbon technologies (renewable hydrogen and CCS)
Strike price	Fixed, based on conventional technology cost and current EU-ETS carbon price[28]	Fixed for renewable energy and variable for low-carbon technologies. Price based on emission reductions (EUR per tonne of CO_2 reduced)[29]
Award criterion	Cost efficiency and relative reduction in GHG	Cost efficiency and intensity per tonne of CO_2 reduced
Contract award process	Competitive allocation via auctions in several bidding rounds, coupled with further criteria	'First come, first served' basis. Below ceiling price until budget is used
Early termination of the contract	Yes, possible after three years under certain conditions	Yes, possible if the project fails to meet obligations or deviates significantly from the plan

Source: Deloitte analysis.

Implementation options for CCfDs in the EU

CCfDs are increasingly capturing industry interest due to their potential to align EU policy decarbonization ambitions with the need to bridge funding gaps necessary for deploying net-zero projects in EIIs. Current developments suggest that CCfDs could be further implemented in the EU through three distinct approaches:

- **At the EU level**: this approach focuses on financing net-zero projects in EIIs across all EU Member States with EU funding.
- **At the national level**: this approach mirrors existing initiatives in the Netherlands and Germany, where CCfDs are being implemented at the national level with national funding resources.
- **In a hybrid approach**: this scenario adopts a model similar to the Auctions-as-a-Service (AaaS) mechanism under the European Hydrogen Bank or the IPCEI. It allows Member States to leverage their national budgets for domestic net-zero projects within a streamlined and uniform process, ensuring compatibility with EU State Aid rules.

For further reference, Appendix 1 compares these three implementation approaches across four categories:

1. Economic efficiency and internal market integrity;
2. Governance;
3. Political and economic influence; and
4. Administrative factors.

The opportunities (+), risks (-), benefits, and challenges associated with each implementation approaches are outlined.

In summary, each approach presents distinct advantages and disadvantages:

- **EU-level scheme**: this approach could enhance financial support, market integrity, cost efficiency, and foster cross-border innovation. However, it may lack the ability to cater to country-specific needs. Additionally, the complexity involved in reaching consensus on an EU-wide scheme could lead to prolonged implementation times.
- **National CCfD schemes**: these schemes could provide tailored solutions specific to each industry and adapt better to country-specific conditions. However, they risk creating fragmentation within the EU, potentially reducing collaboration. The cost of implementing multiple standalone CCfD programs could also exceed that of a single EU-wide approach.
- **Hybrid approach**: this model could strike a balance between the risks and costs associated with multiple national schemes by offering harmonized rules and transparency while allowing for national customization. Nonetheless, it may encounter challenges such as limited resources, implications for competitiveness, or the potential to send misleading market signals regarding the EU's net-zero ambitions.

In conclusion, despite potential political challenges, **we see establishing a CCfD scheme at the EU level** as a central element of a comprehensive industrial transformation policy aimed at **supporting both industrial decarbonization and increase competitivity**. This scheme could incorporate from existing CCfDs schemes in the EU and could specifically target EU EIIs. Funding options could include increased contributions from Member States to the EU budget, the issuance of EU debt, or a higher allocation of EU ETS revenues to the EU budget. **A hybrid approach funded by Member States could serve as a fallback option.**

EIIS can contribute to adequate and faster implementation of CCfDs in the EU

Steps for successful implementation of CCfDs

The successful implementation of CCfDs hinges on effective **collaboration** among **industry stakeholders**, **EU regulators** and **Member States**. Given that CCfDs are likely to be project-based, companies will need to design and propose specific net-zero projects and subsequently seek funding from either national governments or the EU to bring these projects to fruition. To facilitate this process effectively, regulators at both the EU and Member State levels must establish a conducive policy framework and engage collaboratively with companies during the project development and funding phases.

Figure 8 illustrates the **four essential steps required for the effective implementation of CCfDs**.

Figure 8. Four steps needed for CCfD implementation

Proactive engagement with policy makers

A proactive approach with policy makers is crucial for EIIs aiming to support the development of project-led schemes like CCfDs. Here are some key actions to consider:

- **Understand State Aid rules and CCfD concepts:** Familiarize yourself with State Aid regulations and the principles of CCfDs to navigate the complex regulatory landscape effectively.
- **Engage with policymakers:** Clearly communicate which technologies should be included in CCfD schemes, emphasizing their benefits, such as a low cost per ton of avoided CO_2 and significant savings potential.

Contribute to CCfD program design

To help design the CCfD program framework and operational details, EIIs could collaborate with policymakers as follows:

- **Definition of CCfD objectives and scope**: establish the primary goals of the CCfD program, including target sectors, expected outcomes, and alignment with EU climate objectives.
- **Development of comprehensive guidelines**: create detailed guidelines for project eligibility, application processes, and the criteria for funding allocations to ensure transparency and consistency.
- **Integrate flexibility mechanisms**: design the program to include flexibility for adjustments based on market developments, technological advancements, and changing regulatory landscapes.
- **Pilot testing and iteration**: launch pilot projects to test the CCfD mechanism on a smaller scale, gather feedback, and refine the program design based on real-world outcomes.

Assess net-zero project and design business case

To succeed in driving a net-zero project from conception to action, it is essential to assess various net-zero technologies, select the most suitable options and design the business case. Key evaluation criteria and actions include:

- **Technology maturity:** examine the development stage of each net-zero technology with a potential to reduce GHG emissions significantly, including phases of research, testing, and implementation readiness.
- **Decarbonization potential:** measure the technology's capacity for reducing carbon emissions and its overall impact on achieving net-zero goals.
- **Capital for low green premium:** evaluate the financial investment required to achieve economies of scale and ensure competitive costs compared to traditional, fossil-based alternatives.
- **Energy security potential:** analyze how the technology can help reduce dependence on fossil fuels and enhance energy efficiency.
- **Security of raw materials/supply chains:** assess the reliability and sustainability of material sourcing and the robustness of the supply chain for the selected net-zero technology.
- **Conducting risk assessment**: to attract investors and ensure financial de-risking, a thorough risk assessment should be conducted.
- **Design viable business cases:** develop a robust business case for the technological solution underpinning the net-zero project.

Bidding process for CCfD auctions

To maximize the chances of success in the bidding process for CCfD auctions, EIIs should engage in the following steps:

- **Proactive engagement:** gain a thorough understanding of the government scheme and tailor bids to meet its objectives. Actively engage with stakeholders to clarify expectations and requirements.
- **Invest time and resources:** dedicate sufficient time and resources to prepare strong bids. Address uncertainties by asking relevant questions and ensuring all aspects of the proposal are well-articulated.
- **Ensure proposal viability:** adhere to all requirements outlined in the bidding process. Seek informal feedback on the proposal to identify areas for improvement.
- **Calculate expected payouts:** analyze the technology's emissions and project profitability by calculating expected payouts based on price projections for CO_2, hydrogen, electricity, and other relevant factors.
- **Ensure compliance:** strictly adhere to all policy regulations and guidelines throughout the bidding process.
- **Determine optimal bid price:** establish an optimal bid price that balances the level of support needed with the likelihood of being selected in the auction, considering the overall competitiveness of the bid.

Conclusion

CCfDs could mobilize capital and de-risk investments for net-zero projects

CCfDs could be a key instrument for mobilizing capital by de-risking private investment for EIIs in net-zero projects. However, it is important to recognize that CCfDs on their own cannot help address key challenges for EIIs such as high energy or feedstock prices, policy unpredictability or regulatory complexity. These issues will require additional solutions including reductions to energy costs, deployment of infrastructure or reforms.

However, CCfDs can play a pivotal role for the EU to address the existing funding shortfalls for the industry and support the EU to address the current decline in competitiveness while achieve its ambitious emission removal goals.

EIIs can help design and implement CCfDs

EIIs can contribute to the design and successful implementation of CCfDs in the EU. As EIIs review potential investments in new technologies to meet their 2030 and post-2030 emission targets, they should consider whether and to what extent CCfDs could change the economics of the investment opportunities. Understanding the mechanics of the instruments and how they might be deployed in the EU is critical to this analysis.

Once EIIs understand CCfDs and determine that they could be a potentially viable option to mobilize capital and de-risking private investment, they could engage proactively with policymakers. More specifically, EIIs could explain the benefits of CCfDs to their businesses, and could support policymakers in defining the objectives and scope of the CCfD, develop guidelines, ensure flexibility mechanisms are integrated and launch pilot projects to test the CCfD mechanism on a smaller scale before full implementation.

Appendix 1: Comparison of three implementation scenarios of CCfDs

Category	EU Level	National Level	Hybrid approach
Economic efficiency and internal market integrity	**(+) Scale and scope**: centralizing resources enables greater financial support and risk sharing, facilitating emissions reduction on a larger scale. **(+) Design and implementation costs**: centralized system offers efficiencies that reduce costs of operating such schemes. **(+) Innovation and collaboration**: EU-level CCfD fosters cross-border projects, promotes sharing of best practices across Member States. **(+) Market integrity and signals**: centralized CCfDs prevent policy fragmentation, ensuring a level playing field for companies operating in different Member States and better strategic planning, thus protecting the EU Single Market integrity. **(-) Customization**: EU-level approach may stifle national innovation and flexibility, imposing a one-size-fits-all solution that disadvantages EIIs with different national contexts or resources. **(-) Short- and medium-term development**: developing CCfDs at the EU level will be challenging over the next 2–3 years due to ambitious targets and the lengthy procedures. **(-) Adaptation**: political and administrative challenges may delay adaptation to dynamic economic conditions.	**(-) Scale and scope**: smaller or less wealthy Member States may lack the necessary resources for effective development. **(-) Design and implementation costs**: decentralized implementation across multiple authorities may lead to inefficiencies and increased costs. **(-) Innovation and collaboration**: national CCfDs restrict cross-border collaboration and knowledge exchange among Member States. **(-) Market integrity and signals**: Varying national schemes within the EU Single Market may create competitive imbalances and differing market signals, disadvantaging certain countries and complicating EU-wide operations. **(+) Customization**: tailored to local industrial, energy and economic contexts, enhances effectiveness and targeted interventions. **(-) Short- and medium-term development**: national schemes can be developed more quickly, and with some countries already having such schemes, others are likely to follow. However, diverse national approaches hinder harmonization. **(+) Adaptation**: national implementation allows quicker adaptation to dynamic economic conditions, avoiding political and administrative hurdles associated with EU-wide agreements.	**(-) Scale and scope:** smaller or less wealthy Member States may lack the necessary resources to implement an effective scheme. **(+) Design and implementation costs**: harmonized system offers greater efficiencies and reduces costs. **(-) Innovation and collaboration**: a hybrid approach focused on national EIIs discourages cross-border collaboration and knowledge exchange. **(-) Market integrity and signals**: Despite the EC's approval, varying national schemes can create competitive imbalances and inconsistent market signals within the EU Single Market, complicating decisions, and investments for companies with EU-wide operations. **(+) Customization**: enables countries to design schemes suited to local industrial, energy and economic contexts, leading to more effective and targeted interventions. **(+) Short- and medium-term development**: a hybrid model, where national schemes would be developed quicker but under EU coordination, could be a potential short-term solution. **(+) Adaptation**: national implementation bypasses political and administrative EU-wide hurdles, allowing quicker adaptation.
Governance	**(+) Consistency and uniformity**: a standardized scheme across all Member States provides equal opportunities and reduces policy fragmentation. **(+) Transparency and clarity**: an EU-level approach ensures transparent fund allocation. **(-) Consensus-building**: Diverse national interests may hinder centralized control of funding policy, potentially resulting in disagreements and decision-making delays. **(-) Benefits and costs**: national differences in industry, economy, and resources may cause dissatisfaction due to unequal scheme impacts.	**(-) Consistency and uniformity**: national level implementation may create inconsistencies across Member States, leading to different opportunities for EIIs. **(-) Transparency and clarity**: national approaches are not externally audited, raising fund allocation transparency issues. Implementing external audits could address this issue. **(+) Consensus-building**: gaining political support is more easily achievable within individual countries than across the EU. **(+) Benefits and costs:** national schemes align with country's specific industrial structures, economic conditions, and available resources.	**(+) Consistency and uniformity**: hybrid approach ensures a common set of rules across Member States, reducing the risk of policy fragmentation and divergent price signals. **(+) Transparency and clarity**: hybrid approach ensures transparent fund allocation criteria, since the program would be set-up by the EU, Member States and the industry. **(+) Consensus-building**: gaining political support may be more achievable than securing consensus across the entire EU, since the program would not need to be run through centralized funding policies, but by Member States. **(+) Benefits and costs:** national schemes align with country's specific industrial structures, economic conditions, and available resources.

Category	EU Level	National Level	Hybrid approach
Political and economic influence	**(+) Political willingness and stability**: an EU-level approach leverages political willingness to uphold EU commitments to net-zero industrial transition, ensuring stability and effectiveness. **(+) International negotiating power**: a unified EU approach increases influence in international climate negotiations and carbon market developments. **(+) Global competitiveness**: EU-level support for implementing cutting-edge decarbonization technologies enhances the EU's competitiveness and position in the global market. **(+) Investment attractiveness**: an EU-level scheme across Member States provides clearer market signals, encouraging investments in net-zero technologies across the entire Union. **(-) National leadership**: EU-level implementation diminishes individual countries' ability to demonstrate national leadership and individual policies for the industrial sector.	**(-) Political willingness and stability**: Governments may hesitate to commit to energy transition due to short-term costs versus long-term benefits, risking inaction and challenging the sustained commitment and regulatory stability needed for long-term viability. **(-) International negotiating power**: national schemes wield less influence in international climate negotiations and carbon market developments. **(-) Global competitiveness**: without coordinated adoption of net-zero technologies, EU EIIs risk falling behind in critical sectors, impacting competitiveness and global market position. **(-) Investment attractiveness**: fragmented systems may not provide clear market signals for large industrial investors operating across the EU, affecting investments. **(+) National leadership**: Governments can implement robust schemes to demonstrate their leadership and climate action in the industrial sector.	**(-) Political willingness and stability**: Governments may hesitate to commit to energy transition in EIIs due to short-term costs versus long-term benefits. **(+) International negotiating power**: a unified scheme across the EU enhances influence in international climate negotiations and carbon market developments. **(-) Global competitiveness**: EU's EIIs may risk falling behind in critical sectors, jeopardizing competitiveness, and global market position. **(+) Investment attractiveness**: harmonized and streamlined rules across Member States offers clearer market signals, encouraging investments in net-zero technologies across the entire Union. **(+) National leadership**: national governments can implement robust CCfD programs to demonstrate their leadership for sustainable economic development and climate action in the industrial sector.
Administrative	**(+) State Aid approval**: an EU approach eliminates State Aid investigations, reducing bureaucratic hurdles and administrative burdens. **(+) Administrative costs**: consolidating CCfD implementation at the EU level would streamline administrative processes, mitigating duplicative efforts and redundant structures. **(-) Coordination**: an EU approach would require to align EU support provided to the industry through CCfDs with National initiatives, to avoid overlap and ensure effectiveness.	**(-) State Aid approval**: national CCfDs require Commission approval to comply with EU State Aid rules, potentially leading to lengthy negotiations and administrative burdens. **(-) Administrative costs**: multiple national schemes result in duplicated efforts between authorities, requiring redundant administrative structures and processes. **(+) Coordination**: direct management by national administrations reduces bureaucratic overhead and streamlines processes.	**(+) State Aid approval**: simplified approval processes, reducing bureaucratic hurdles and administrative burdens linked to multiple application procedures for companies operating across the EU. **(+) Administrative costs**: harmonizing rules minimizes duplicative efforts, streamlining administrative processes and eliminating redundant structures. **(+) Coordination:** direct management by national administrations reduces bureaucratic overhead and streamlining processes.

Source: Deloitte analysis.

Endnotes

1 https://commission.europa.eu/document/download/e6cd4328-673c-4e7a-8683-f63ffb2cf648_en?filename=Political%20Guidelines%202024-2029_EN.pdf

2 https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52024DC0063

3 Leveraging the Energy Transition: the role of long-term contracts. Page 11

4 https://commission.europa.eu/document/download/e6cd4328-673c-4e7a-8683-f63ffb2cf648_en?filename=Political%20Guidelines%202024-2029_EN.pdf

5 EU loses almost a million manufacturing jobs in just 4 years | ETUC

6 Draghi Report—page 99

7 Draghi Report—page 94

8 Draghi Report—page 96

9 Draghi Report—pages 97 to 102

10 Draghi Report—page 47

11 Draghi Report—page 35

12 eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52023DC0062

13 eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52023DC0062

14 Note: This reflects the aim of avoiding distortions of markets and competition, the risk of which is higher in higher TRLs

15 Note: This initiative includes an Auctions-as-a-Service (AaaS) mechanism, enabling countries to utilize their national budgets for local projects through EU-wide auctions.

16 Draghi Report—page 60

17 Decarbonisation: tackling climate change while leaving no region behind

18 The Commission, along with the Belgian presidency of the Council of the EU, convened an industry summit in Antwerp in March 2024 which presented the Antwerp Declaration for a European Industrial Deal, calling on the EU to “put the Industrial Deal at the core of the new European Strategic Agenda for 2024–2029 (see here).

19 Transformation and Resilience Report_Deloitte_KlimaWirtschaft.pdf

20 Carbon-Contracts_CFMP-Policy-Brief-2020.pdf (climatestrategies.org)

21 Note: Estimates suggest CCfD costs in the EU could amount to a few million euros per country to decarbonize 10% of hard-to-abate sectors (see: 16 Carbon contracts for difference (irena.org)

22 Germany awards first companies with pioneering ‘climate contract’ scheme to slash industry emissions

23 16 Carbon contracts for difference (irena.org)

24 Leveraging the Energy Transition: the role of long-term contracts. Page 11

25 COMMISSION STAFF WORKING DOCUMENT IMPACT ASSESSMENT Accompanying the document COMMUNICATION FROM THE COMMISSION Guidelines on State aid for climate, environmental protection and energy 2022. Page 90.

26 Partitioning the SDE++ budget | Future of Energy | Deloitte Netherlands

27 Germany awards first companies with pioneering ‘climate contract’ scheme to slash industry emissions | Clean Energy Wire

28 The base contract price is calculated in accordance with a dynamization component for the respective billing period ("dynamized contract price"). The base contract price is thus adjusted to the energy carrier amounts of the subsidized plant in the corresponding calendar year and the energy carrier amounts of the dynamized energy carriers.

29 A different base rate has been set for each technology. The base rate is the cost price to produce renewable energy or the cost price of the reduction of CO_2 emissions.

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