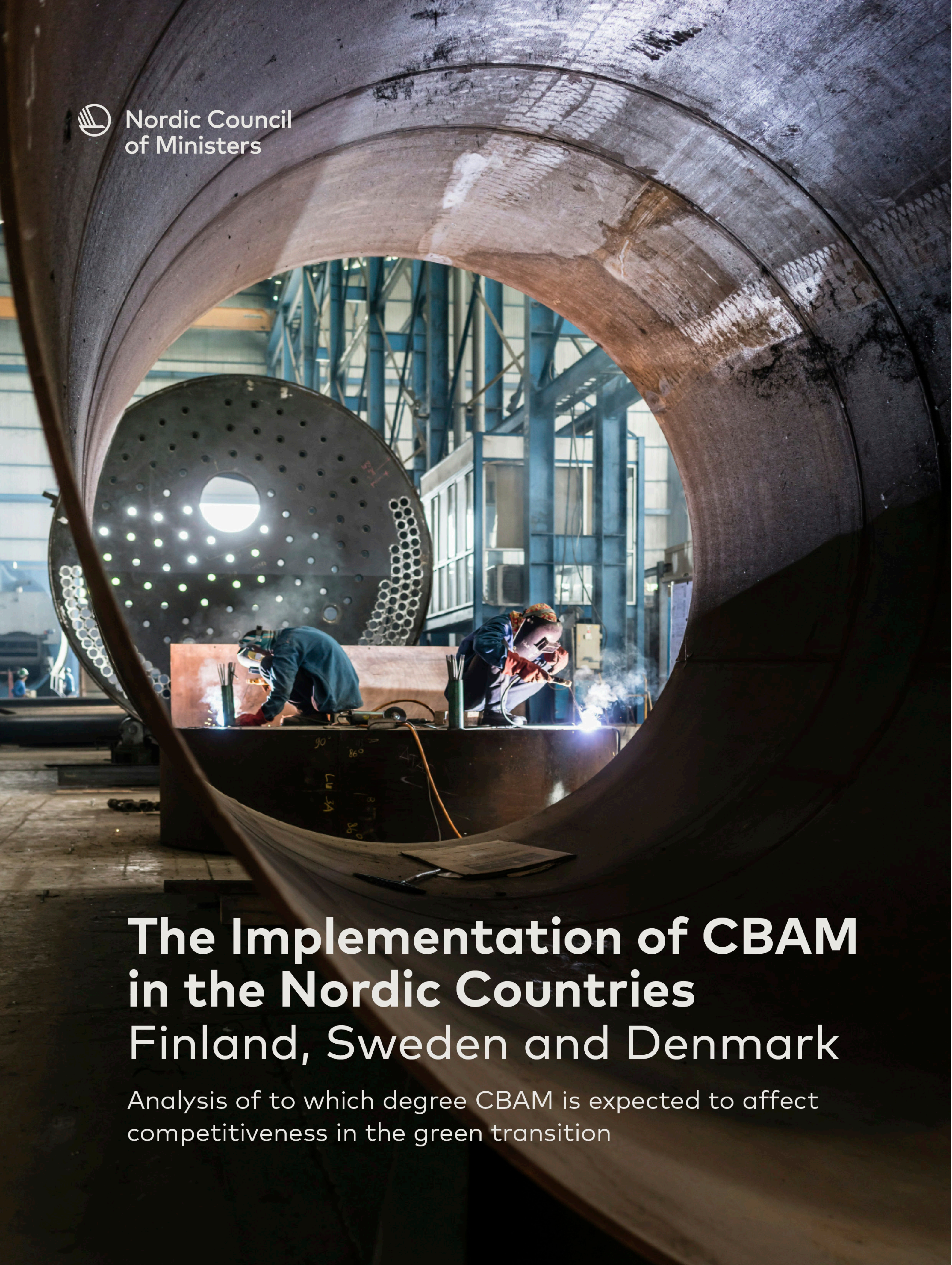

Nordic Council
of Ministers

The Implementation of CBAM in the Nordic Countries
Finland, Sweden and Denmark

Analysis of to which degree CBAM is expected to affect competitiveness in the green transition

Contents

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Preface

This report has been commissioned by the Nordic Environment and Economy programme (NME). The report has been prepared by a consortium led by Norion Consult in cooperation with IVL and ETLA.

EU's carbon border adjustment mechanism, CBAM, aims to prevent carbon leakage and stimulate more ambitious climate policies globally by imposing a carbon levy on imports of certain product groups from countries outside the EU. The price of carbon is linked to EU ETS thereby securing that the price of carbon is the same regardless of where in the world the manufacturing of the commodity. CBAM was fully implemented by January 2026 and initially it applies to the product groups cement, iron, steel, aluminium, and fertilizer.

The overall purpose of this project has been to analyse the current implementation of CBAM in the Nordic countries and how a potential extension of the current framework affects Nordic countries. The report focuses especially on the implementation of CBAM in the EU Member Countries Sweden, Denmark and Finland. The report concludes that the Nordic countries might benefit from an expansion of the framework to include indirect emissions as that would allow Nordic producers to benefit from the cleaner energy mix. The Nordic countries are recommended to prepare strategically for inclusion of indirect emissions, consolidate and streamline national implementation, and use CBAM as a lever for green industrial transition. Although CBAM is effective, there are many uncertainties as to how the long-term framework will look like. CBAM is only one of many elements in an effective climate and industry policy mix. Effective CBAM implementation in the Nordics must be paired with overall policy stability, technological support and stakeholder dialogue.

Members of the Nordic Environment and Economy programme have provided comments and inputs to the report during the work. The authors of the report are responsible for the content as well as the assessments and recommendations, which do not necessarily reflect the views and the positions of the governments in the Nordic countries.

January 2026
Lisa Björk
Chair of the Nordic Environment and Economy Programme

Summary

The report analyses the implementation and impacts of the EU's Carbon Border Adjustment Mechanism (CBAM) in Finland, Sweden, and Denmark, with a focus on competitiveness, the green transition, and emissions outcomes. CBAM, introduced in 2023 and gradually entering its definitive regime from 2026, is designed to prevent carbon leakage by aligning the carbon cost of imports with that faced by EU producers under the EU Emissions Trading System (EU ETS). While CBAM is not a climate mitigation instrument in itself, it supports the EU ETS by discouraging carbon-intensive imports and reinforcing incentives for cleaner production.

The study concentrates on four CBAM-covered sectors that are particularly relevant for the Nordic region: iron and steel, cement, aluminium, and fertilizers. These sectors are emissions-intensive, highly exposed to international trade, and central to Nordic industrial strategies. Nordic producers generally have lower emission intensity than many global competitors, due to cleaner energy systems and early investments in low-carbon technologies, which positions them relatively well under CBAM. However, structural disadvantages such as high wages, energy costs, and land prices mean that CBAM alone will not guarantee long-term competitiveness.

A key issue explored is the potential inclusion of indirect emissions (from electricity use) in CBAM. The report finds that excluding indirect emissions currently disadvantages Nordic producers, who often rely on electrified but higher-cost low-carbon power, while imports do not fully reflect electricity-related emissions. Including indirect emissions would better reflect environmental performance and could strengthen Nordic competitiveness but would also increase reporting complexity and raise costs for electricity-intensive imports such as aluminium.

Macroeconomic modelling suggests that CBAM will have modest overall economic impacts for Denmark, Finland, and Sweden, but more pronounced sectoral effects. CBAM-covered industries in the Nordics are likely to gain competitiveness as carbon-intensive imports become more expensive, while downstream industries that use CBAM goods as inputs may face slightly higher production costs . Over time, CBAM is expected to shift trade patterns toward cleaner EU production, encourage investment in low-carbon technologies, and support the Nordic green industrial transition, though total EU emissions remain governed by the EU ETS cap.

The report also examines national implementation models. All three countries combine a national competent authority with customs administration: Denmark relies on a tripartite system led by the Danish Energy Agency, Finland assigns both roles to Finnish Customs, and Sweden designates the Environmental Protection

Agency alongside Swedish Customs. Effective implementation depends heavily on clear guidance, sufficient administrative resources, and reliable IT systems.

In terms of emissions accounting, CBAM is expected to gradually reduce Nordic consumption-based emissions by discouraging high-carbon imports and promoting cleaner suppliers. However, current consumption-based accounting models are not well suited to capture CBAM's highly granular emissions data, although CBAM offers opportunities to improve data quality in the future.

The report concludes with policy recommendations, including preparing for the inclusion of indirect emissions, actively shaping EU rules for recognizing third-country carbon pricing, prioritizing key sectors for CBAM expansion (such as organic chemicals and certain downstream products), streamlining national implementation, and integrating CBAM data into emissions accounting systems. Overall, CBAM is seen as a valuable complement to the EU ETS that can enhance Nordic competitiveness in low-carbon industries, provided it is paired with stable climate policy and targeted industrial support.

Sammenfatning

Rapporten analyserer implementeringen og virkningerne af EU's Carbon Border Adjustment Mechanism (CBAM) i Finland, Sverige og Danmark med fokus på konkurrenceevne, den grønne omstilling og emissionsudvikling. CBAM blev indført i 2023 og overgår gradvist til den endelige ordning fra 2026. Mekanismen har til formål at forhindre carbon leakage ved at sikre, at importvarer pålægges en CO_2-omkostning svarende til den, som EU-producenter betaler under EU's kvotehandelssystem (EU ETS). CBAM er ikke i sig selv et klimavirkemiddel, men understøtter EU ETS ved at reducere incitamentet til at flytte produktion til lande med mindre stram klimapolitik.

Analysen fokuserer på fire centrale sektorer: jern og stål, cement, aluminium og gødning. Disse sektorer er både emissionsintensive, handelsudsatte og økonomisk vigtige for Norden. De nordiske producenter har generelt en lavere emissionsintensitet end mange globale konkurrenter, blandt andet på grund af renere energisystemer og tidlige investeringer i lavemissionsteknologier. Det giver dem et relativt godt udgangspunkt under CBAM. Samtidig peger rapporten på strukturelle ulemper såsom høje lønninger, energiomkostninger og produktionsomkostninger, hvilket betyder, at CBAM alene ikke sikrer langsigtet konkurrenceevne.

Et centralt tema er den mulige inddragelse af indirekte emissioner fra elforbrug i CBAM. Den nuværende udelukkelse af indirekte emissioner skaber ifølge rapporten en konkurrenceulempe for nordiske virksomheder, som i stigende grad elektrificerer produktionen og betaler højere priser for lavemissionsel. En inddragelse af indirekte emissioner vil bedre afspejle produkternes reelle klimaaftryk og potentielt styrke nordisk konkurrenceevne, men vil også øge administrative byrder og hæve priserne på elintensive importvarer, særligt aluminium.

Makroøkonomiske analyser viser, at CBAM forventes at have begrænsede samlede økonomiske konsekvenser for Danmark, Finland og Sverige, men mere markante sektorvise effekter. De sektorer, der er direkte omfattet af CBAM, vil generelt styrke deres konkurrenceposition, mens downstream-industrier, der anvender CBAM-produkter som input, kan opleve mindre omkostningsstigninger. På længere sigt forventes CBAM at ændre handelsmønstre til fordel for renere EU-produktion, understøtte investeringer i grøn teknologi og bidrage til den nordiske grønne industris omstilling, selv om de samlede EU-emissioner fortsat bestemmes af EU ETS-loftet.

Rapporten gennemgår også de nationale implementeringsmodeller. I alle tre lande kombineres en national kompetent myndighed med toldmyndighederne. Danmark har en tredelt model med Energistyrelsen som hovedansvarlig, Finland har samlet ansvaret hos Toldstyrelsen, og Sverige har Miljøstyrelsen i tæt samarbejde med toldvæsenet. En velfungerende implementering afhænger især af klare retningslinjer, tilstrækkelige ressourcer og stabile IT-systemer.

I forhold til forbrugsbaserede emissioner forventes CBAM gradvist at reducere de nordiske landes klimaaftryk ved at gøre kulstofintensive importvarer dyrere og fremme renere leverandører. De nuværende beregningsmodeller er dog ikke tilpasset CBAM's detaljerede emissionsdata, selv om mekanismen på sigt kan forbedre datakvaliteten og præcisionen i emissionsopgørelser.

Rapporten afslutter med en række politiske anbefalinger, herunder at forberede sig på inddragelse af indirekte emissioner, engagere sig aktivt i EU's regler for anerkendelse af tredjelandes CO_2-prissætning, prioritere udvidelse af CBAM til relevante sektorer, effektivisere national administration samt styrke koblingen mellem CBAM og emissionsregnskaber. Overordnet vurderes CBAM som et vigtigt supplement til EU ETS, der kan styrke nordisk konkurrenceevne i lavemissionsindustrier, hvis det kombineres med stabile klimapolitiske rammer og målrettet industripolitik.

1. Introduction

The Carbon Border Adjustment Mechanism (CBAM) marks a fundamental shift in the EU's climate and industrial policy architecture. Introduced in 2023 and gradually expanded toward its definitive regime in 2026–2034, CBAM seeks to ensure that the carbon content of imported goods is priced equivalently to that of goods produced within the EU. By doing so, it aims to prevent carbon leakage, safeguard the effectiveness of the EU Emissions Trading System (EU ETS) and encourage cleaner production practices globally.

While the EU Emissions Trading System (EU ETS) is the central instrument driving emission reductions and the green transition within the EU, CBAM is a trade-related mechanism designed to prevent carbon leakage by aligning the carbon cost of imports with that faced by EU producers. For the Nordic countries—characterised by ambitious climate targets, advanced industrial sectors, and relatively low-carbon production profiles—CBAM represents both an opportunity and a strategic challenge. As the mechanism progresses through its transitional phase and into the definitive regime, Nordic industries face new competitive dynamics, shifting cost structures, and new administrative requirements. At the same time, by supporting the effectiveness of the EU ETS and reducing carbon leakage risks, CBAM may indirectly influence investment incentives for low-carbon industrial investment, reshape trade patterns, and influence both territorial and consumption-based emissions in the region.

This report, commissioned by the Nordic Council of Ministers' Nordic Environment and Economy Programme, aims to map and analyse how an expansion of CBAM could impact the Nordic countries, as well as its effect on the green transition and consumption-based emissions. Key areas of focus include the inclusion of indirect emissions, the potential expansion to new industries, the implications for Nordic industry competitiveness, and the green transition. Additionally, the project examines administrative requirements for effective implementation and the effects of CBAM on consumption-based emissions. The focus of the report is on the implementation of the CBAM in Sweden, Denmark and Finland.

Key questions to be answered from a Nordic perspective:

- How would the inclusion of indirect emissions in CBAM affect the Nordic countries and their industrial competitiveness?
- What impact would including indirect emissions have on emission pricing incentives in third countries?
- Which industries would be particularly relevant to consider for an expansion of CBAM to new sectors?
- How could CBAM influence the green transition in the Nordic countries in the long run?
- What potential positive effects could CBAM have from a Nordic perspective?
- What conditions must be met for CBAM to function effectively?
- How will CBAM affect industries that are strongly represented in the Nordic countries in both the short and long term?
- What administrative arrangements have Nordic countries implemented for CBAM, and which authorities are responsible for its execution?
- How might CBAM impact consumption-based emissions in the Nordic countries, and can current calculation systems account for these changes?

Four sectors—iron/steel, cement, aluminium, and fertilisers—form the empirical focus of the study. These sectors are highly relevant for the Nordic region due to their economic importance, emissions profiles and exposure to international trade. They also reflect areas where the interplay between EU climate policy, global supply chains, and domestic industrial strategies is expected to be particularly significant.

The report has been authored by Rikke Fischer-Bogason, Matias Lund Pedersen, Laura Schou Bagh, Agnes Plesner Skårup and Amalie Engelbrecht, Norion Consult (Denmark), Lars Zetterberg and Johan Rootzén IVL (Sweden), and Tero Kuusi, ETLA (Finland).

2. Background

The Carbon Border Adjustment Mechanism (CBAM) entered into application on the 1st of October 2023. The introduction of CBAM will make it possible to continue strengthening the EU Emissions Trading System (EU ETS) while ideally creating a level playing field between producers inside and outside the EU. The mechanism is intended to fight carbon leakage, to put a fair price on the carbon emitted during the production of carbon intensive goods that are entering the EU, and to encourage cleaner industrial production in non-EU countries. CBAM applies to both raw materials and the products manufactured from them.

CBAM addresses the competitive distortion that arises when companies producing and selling goods within the EU must pay for their emissions while competing with imported goods from companies out-side the EU who are not subject to the same climate regulations. However, the mechanism does not address the equivalent situation when an EU company exports goods outside the EU. In this case, the company incurs costs due to the EU's climate policies but competes with firms that do not face the same regulations or expenses. An export rebate or export scheme to compensate for these additional costs is being prepared by the Commission and was expected to be presented by end-2025.[1]

Trade and competitiveness effects
Beyond trade implications, CBAM plays a critical role in the EU's green transition. While it is expected to encourage sustainable practices, it also risks raising costs for European manufacturers reliant on import-ed materials. Companies operating in regions with cleaner energy sources, such as the Nordic countries, could gain a competitive advantage, as their products will likely be less affected by carbon tariffs. The ongoing phase-out of free emissions allowances under the EU ETS is expected to further strengthen CBAM's influence, ensuring that the carbon footprint of a product is reflected more transparently in its price. However, the success of this transition will depend largely on how businesses and countries adapt. Companies that invest in clean technology will have the opportunity to strengthen their market position, while those in high-emission industries may face increased costs and trade restrictions.

National implementation and administrative requirements
The implementation of CBAM will differ across EU member states, not because of differences in reporting IT systems, but due to national administrative arrangements for guidance, access management, control and enforcement. CBAM reporting is conducted through EU-wide IT systems – the CBAM Transitional Registry and the CBAM Registry – which are operated by the European

1. The export rebate had not yet been presented by the finalisation of this report

Commission. Differences in how Finland, Sweden and Denmark structure their CBAM administration, including the allocation of responsibilities between competent authorities and customs, the provision of guidance to companies, and the availability of support resources, could nevertheless lead to variations in compliance and ease of reporting for importers. Expanding CBAM will put additional administrative burdens on national authorities, particularly in terms of guidance, verification, coordination and enforcement, even though the underlying reporting systems are managed at EU level. Importers will need to collect more detailed emissions data from suppliers, and for product categories where applicable, pay an additional carbon fee, corresponding to the indirect emissions. Suppliers will have to ensure accurate reporting to avoid placing additional costs on their customers. The inclusion of indirect emissions is expected to have a substantial effect on total carbon costs, which in turn will influence the competitiveness of industries across different countries.

Transitional phase (2023–2025)
CBAM implementation happens gradually. It involves transitional phases and gradual extension of the system. The transitional phase has been from 1 October 2023, until 31 December 2025, and in this phase the companies have been mandated to report their imports and associated emissions, but not mandated to pay the associated carbon fee. During this transition, importers of covered products have been obliged to report the greenhouse gas emissions (GHG) embedded in their imports on a per-product basis, though no financial adjustments has been required. This period serves two key purposes: first, to provide a learning opportunity for all involved parties, including importers, producers, and regulatory authorities; and second, to collect data on embedded emissions to refine the methodology. While the reporting obligation falls on EU importers, exporters will also face a considerable compliance burden due to the need to compile and provide emissions data.

Currently, imports from six sectors must be reported within CBAM.

- Cement
- Fertilizer
- Aluminium
- Iron and steel
- Hydrogen
- Electricity

It is the EU's intention to progressively increase the scope of CBAM to cover more sectors and product categories. The six sectors were chosen as they represent a significant risk of carbon leakage. By aligning import costs with carbon emissions, CBAM seeks to uphold the integrity of EU climate policies, most importantly the EU

ETS, while encouraging investments in low-carbon technologies. At the same time, the policy introduces complexities in global trade, as it affects the competitiveness of both European industries and foreign exporters.

Definitive regime (2026–2034)

Between 2026 and 2034, the implementation of the CBAM will gradually coincide with the phase-out of free allowances under the EU ETS. Per 2026, affected companies must pay for the tonnage of embedded carbon in their imported products, effectively ensuring that high-emitting products imported from outside of the EU become more expensive. If the import has already been applied a non-EU carbon fee or tax, the amount paid can be deducted from the CBAM import fee.

The scope of emissions covered under the CBAM definitive regime is defined in Regulation (EU) 2023/956. From 2026 and until any amendment of the Regulation, it is clear which emissions must be calculated, reported and subject to the CBAM financial adjustment for each product category.

Under the current Regulation, direct emissions are included for all CBAM-covered products, while indirect emissions from electricity consumption are included only for selected product categories. Specifically, indirect emissions are included for cement and fertilisers, while for iron and steel, aluminium and hydrogen only direct emissions are to be calculated and taken into account.

Article 30 of the CBAM Regulation mandates the European Commission to assess, by 2025, whether the scope of CBAM should be expanded, including the possible inclusion of indirect emissions for additional product categories in the future. While this implies that the scope of CBAM may change over time, the applicable rules for the definitive regime from 2026 are clearly defined under the current Regulation.

Sector	Must report: Direct emissions	Must pay credits: Direct emissions	Must report: Indirect emissions	Must pay credits: Indirect emissions
Cement	☑	☑	☑	☑
Fertilizer	☑	☑	☑	☑
Aluminium	☑	☑		
Iron and steel	☑	☑		
Hydrogen	☑	☑		
Electricity	☑	☑		

Table 1. The Current reporting and tariff scope of CBAM across sectors, in the definitive regime.

Note: For products listed in Annex II to Regulation (EU) 2023/956 (iron and steel, aluminium and hydrogen), only direct emissions are to be calculated and taken into account under Article 7. Indirect emissions are therefore neither reported nor subject to CBAM payments for these products under the current Regulation.

Trade dynamics and international reactions

The economic and trade consequences of CBAM is a key area of discussion and many uncertainties exist during the transition phase. While CBAM aims to prevent carbon leakage and level the playing field be-tween EU and foreign companies, the policy still raises concerns regarding trade dynamics. Nordic industries, particularly carbon emissions-intensive industries such as steel and iron, may benefit from the changes that follow with CBAM, as EU buyers could be more likely to favour lower-carbon domestic products over imports from countries with high emissions, such as China, India or Russia. At the same time, developing nations have raised concerns over CBAM, with countries like India threatening a legal challenge under WTO rules, arguing that the policy functions as a trade barrier that disproportionately affects non-EU producers.

Taken together, the developments presented above illustrate that CBAM is more than a trade instrument. For Finland, Sweden and Denmark, CBAM presents a mix of opportunities and challenges: on one hand, it may reinforce the competitive position of low-carbon Nordic industries; on the other, it introduces new reporting obligations, cost uncertainties, and exposure to evolving international trade dynamics. As the EU transitions from the reporting phase to the definitive regime, and as the scope of CBAM expands, understanding these implications becomes essential. The following chapters therefore examine in detail how CBAM interacts with sector-specific characteristics, national contexts, and the broader green transition in Denmark, Finland, and Sweden.

3. Scope of the study and core definitions

This chapter outlines the overall scope and analytical boundaries of the study. It defines which sectors and countries are included in the assessment, and clarifies key terminology used throughout the report.

3.1 Scope of sectors and countries

The report focuses on five sectors covered by CBAM: iron/steel, aluminium, cement, and fertilizers, given their strategic economic and climate relevance in the region. The geographic focus is Denmark, Finland, and Sweden.

Selected sectors

Iron and steel

The iron and steel industry are one of the most energy- and emissions-intensive sectors globally, and a critical focus of CBAM. In the Nordics, the majority of primary steel is produced via the integrated blast furnace–basic oxygen furnace (BF–BOF) route, which relies heavily on coal-derived coke as both fuel and reducing agent (See e.g. Toktarova et al., 2020). Electric arc furnaces (EAFs), which are significantly less carbon-intensive, are also present and increasingly used. The Nordic region currently hosts three integrated steel plants and a number of EAF-based facilities. Importantly, several Nordic steel producers have announced or initiated major investments in fossil-free steelmaking, positioning the region as a potential frontrunner in decarbonizing this sector. Understanding how CBAM interacts with these investments is essential to inform both climate and industrial policy. The Nordic steel market is distinguished by a strong emphasis on the production and export of high-quality, specialized steel products, while simultaneously relying on imports of lower-grade and commodity steel to meet broader domestic demand.

Steel production in the Nordic countries—particularly in Sweden and Finland—is highly advanced and capital-intensive, with a focus on niche products, high-strength steels, and customized steel solutions for sectors such as automotive, engineering, and construction. These value-added steel products are primarily exported to European and global markets, supported by strong industrial R&D and investments in fossil-free steel technologies. At the same time, the Nordic region imports a significant share of lower-grade, mass-produced steel, such as rebar, standard coils, and sheets. These imports typically come from countries with lower production costs and environmental standards, including some outside the EU. The introduction of CBAM is therefore particularly relevant, as it may shift the balance by raising the cost of carbon-intensive steel imports, thereby improving the competitiveness of domestic production—especially in the lower-grade segment—while also supporting ongoing investments in low-carbon, high-quality steel production.

Cement

Concrete continues to play a central role as a structural material in buildings and infrastructures. However, cement production, central to concrete manufacturing, significantly contributes to global greenhouse gas emission. Alternatives to carbon-intensive cement and concrete products exist today and have the potential to scale and cost-effectively decarbonise the construction industry dramatically within the coming years. In order to bring about mass deployment, industry must be given the right signals to decarbonise as soon as possible.

Most cement is produced and consumed locally due to its relatively low value per unit weight, meaning transport makes up a disproportionately high percentage of its total manufacturing cost. Despite regional trade and the presence of a few independent importers, the Nordic cement manufacturers typically dominate their respective home markets (see e.g. Rootzén & Johnsson, 2015, 2017). While the proportion of cement production exported internationally has increased, the market remains largely regional in nature. The low trade intensity and local production means that the risk of carbon leakage for the cement industry is relatively low.

The cement industries in Denmark, Sweden, and Finland have all announced plans and are, at varying stages, implementing carbon capture and storage (CCS) technologies as a key strategy to achieve deep decarbonization. Implementation of CBAM, coupled with a removal of free allocations, would send strong signals to industry and help the Nordic cement industry become a world leader in low-carbon cement and concrete and other alternative construction technologies.

Fertilizers

Fertilizer production is one of the most energy intensive industries in the world, being responsible for 3%– 5% of global natural gas consumption every year (Song et al., 2018). Given the central role of agriculture in Denmark's economy, the country imports and uses considerable quantities of fertilizer. Sweden has two on-going start-up projects to develop fossil-free ammonia and fertilizer production in Sweden (Power2Earth, n.d.). LKAB is lead on the other project, constructing a demonstration facility to among other things develop mineral fertilizers from material streams from iron ore production (LKAB, 2024). Simultaneously, there is a significant fertilizer production in Europe, from both natural and artificial sources. Fertilizer is an interesting case in this project, as it is readily available from European producers, but the import from non-European countries is significant. Developing countries dominate EU imports, unlike exports, making them more vulnerable to economic losses from rising export costs due to certification requirements. Higher costs could hurt fertilizer-exporting nations, leading to increased fertilizer prices and potential risks for the agricultural sector. Focusing on fertilizers in this project will help to evaluate how important price is as a factor for fertilizer importers. As well as how CBAM will affect national initiatives to decarbonise the sector and secure regional production. This can in turn support policies, that aims to reduce imports from outside of Europe and ensure long term stability for low-carbon investments.

Aluminium
Aluminium is an energy intensive raw material to produce, requiring both high amounts of heat and electricity. In 2024, only 3.8% of primary aluminium was produced within Europe with 59% of primary aluminium produced in China (*Primary Aluminium Production*, 2024). In 2023, 72% of the energy used to smelt primary aluminium in China came from coal, which is bound to lead to a high level of embedded carbon per tonne imported aluminium ('Primary Aluminium Smelting Power Consumption – by Country', n.d.). Due to the high environmental impact of producing primary aluminium, and due to the high degree of imports into the EU, aluminium is a material with a high risk of carbon leakage.

Conversely, aluminium is produced in high quantities in Norway, which offers a short-term alternative to imported aluminium (*Norwegian Aluminium Industry with Billion in Added Value*, n.d.). There is also a significant environmental potential to recycling aluminium. Aluminium as a material is highly recyclable, and secondary aluminium can be recycled many times without losing material properties (Zore, 2024).

Focusing on aluminium in this report helps clarify how CBAM will affect the sector and enables policymakers to identify market mechanisms that could complement the regulation.

Selection of countries
Denmark, Finland, and Sweden have been chosen for the comparative analysis. All three countries are committed to ambitious climate targets and are exploring decarbonization pathways for industry. They each have significant activity in at least one of the selected sectors, making them particularly relevant for understanding the sector-specific impacts of CBAM. Despite their similarities, they differ in industrial composition, trade patterns, and exposure to international competition —providing useful variation for the analysis.

Since neither Norway nor Iceland is part of the EU, it is up to each EEA (European Economic Area) country to decide if new EU legislation should be implemented or not.

The Norwegian government announced its intention to implement the Carbon Border Adjustment Mechanism (CBAM) in a press release in late 2024 after consulting with national business and workers' organisations, both of which expressed support for its implementation (Finansdepartementet, 2024). The government currently plans to introduce the mechanism from 1 January 2027, with the Norwegian Environment Agency leading the process (Miljødirektoratet, 2025). Norway was not included in the transitional phase of CBAM, and some of the key questions for this study are not yet relevant for Norway. Norway will, however, be able to benefit from the learnings from the transition phase from the other Nordic countries once they are compiled and assessed in the tendered project. Iceland's stance on CBAM is still not determined and it is thus assumed that no implementation plans are being developed for the time being (as of 2025).

3.2 Terminology

To support a consistent understanding of the analyses presented in this report, this section introduces key terms and concepts central to interpreting the implications of CBAM. Clarifying these concepts is essential, as CBAM interacts with multiple emission scopes, methodological frameworks, and trade-related dynamics, all of which influence how impacts are assessed and compared across sectors and countries.

Impacts of CBAM on calculation/estimates of consumption-based emissions
Calculations of estimates are generally based on environmentally extended multi-regional input-output (EE-MRIO) models. These models trace the embedded emissions of goods and services consumed in a country, including those produced abroad based on trade flow data, sectoral production data and country- or region-specific emission intensities. However, these models often use average national emission intensities rather than firm- or batch-specific data. CBAM is designed to target the actual embedded emissions in specific imports (e.g. a tonne of cement from one factory in Turkey). Current EE-MRIO is not adapted to capture this level of granularity. Further Input-output models are based on statistical data that may be several years old. CBAM's effects—especially early shifts in trade patterns or cleaner production methods—may not be captured in real time.

Direct and indirect emissions
Under the CBAM framework, direct and indirect emissions are defined in Regulation (EU) 2023/956 and relate to emissions associated with the production of specific goods. Direct emissions under CBAM refer to emissions from fuel combustion and production processes at the installation producing the CBAM-covered good. Indirect emissions under CBAM refer to emissions from the generation of electricity consumed during the production of certain CBAM-covered goods, as specified in the Regulation.

Scope 1, Scope 2 and Scope 3 emissions are accounting concepts used in corporate greenhouse gas reporting. While there is partial overlap with CBAM concepts, the definitions and boundaries do not fully correspond, and the terms should not be used interchangeably. The CBAM levy is determined by the emissions embedded in imports, which include direct emissions from fuel combustion and the production process and, for selected CBAM-covered products, indirect emissions from electricity used in production. Emissions embedded in input materials are included only where those inputs are themselves CBAM-covered. Under the current CBAM Regulation and in the definitive regime from 2026, only cement and fertilisers are subject to CBAM charges for indirect emissions from electricity consumption. For iron and steel, aluminium and hydrogen, only direct emissions are taken into account under CBAM, while electricity as a CBAM-covered product has no separate category of indirect emissions, as emissions from power generation are treated as direct emissions. Computing indirect emissions for the product categories where they are covered under CBAM will pose significant challenges along the value chain due to the granularity details needed in the data that is often not available in current reporting systems.

Furthermore, as the Nordic economy decarbonizes, electricity usage and costs become an increasing part of the production process. Hence, the exclusion of indirect emissions can directly impact the competitiveness of Nordic industry, both in the domestic and international markets. Combined with the phase-out of free allowances under the EU ETS and a higher EU carbon price, production prices will rise and can cause a competitive disadvantage for Nordic products in international markets.

Including indirect emissions in CBAM fees could in turn have additional impact on third countries incentives to implement a carbon pricing mechanism on emissions. Crediting the climate policies of third countries could encourage them to adopt such measures and avoid double charging for the carbon in the goods covered. However, not crediting them is technically and administratively simpler. The key issue isn't just whether to credit these policies, but also presents challenges, like differences in sectoral coverage across countries.

The inclusion of indirect emissions could therefore potentially have significant impact on both Nordic industries´ competitiveness as well as incentives along the value chain in third countries to reduce carbon emissions from production processes for goods imported to the EU. While at the same time, posing some challenging questions to the EU on defining which other carbon credit schemes should be accredited, which sectors to include and what price levels should be considered equivalent to the EU ETS.

Addressing indirect emissions therefore has significant impact on the competitiveness on Nordic industries combined with environmental impact along the value chain and inconsistencies in carbon pricing across sectors and countries. While the EU ETS is the primary driver of decarbonisation in the Nordics, CBAM may complement this process by influencing competitiveness and trade patterns, which in turn could affect the green transition, particularly in electrification-intensive heavy industry sectors.

4. Key findings and recommen-dations

4.1 Summary of key findings

How would the inclusion of indirect emissions in CBAM affect Finland, Sweden and Denmark and their industrial competitiveness?
Including indirect emissions in CBAM would raise the calculated embedded emissions of imported goods and thereby reinforce CBAM's protective function for EU producers. For the Nordics, where decarbonisation and electrification mean electricity is an increasingly important cost component, the current exclusion of indirect emissions under CBAM creates a competitive disadvantage: Nordic producers pay higher costs for low-carbon electricity while competing with imports where electricity emissions are not fully priced. Including indirect emissions would better reflect the environmental performance of Nordic industries and could strengthen their competitiveness, but it would also increase reporting complexity and data demands along the value chain as well as raise import prices on electricity-intensive goods such as aluminium. On the other hand, a large share of Nordic electricity generation is already fossil-free, meaning that electricity prices in the Nordics generally reflect lower ETS-related cost pass-through compared to regions with more carbon-intensive power generation. This is, however, a complex matter, as power prices in at least Denmark and Southern Sweden are affected by German power prices and these price in the carbon cost.

What impact would including indirect emissions have on emission pricing incentives in third countries?
Because CBAM allows deduction of carbon prices already paid in the country of origin, including indirect emissions would broaden the share of emissions for which such credits may be claimed. This strengthens incentives for third countries to introduce or expand carbon pricing instruments that cover both direct and indirect emissions, in order to keep access to the EU market and avoid double charging. The report notes, however, that recognising third-country pricing schemes raises technical and administrative questions, including how to handle differences in sectoral coverage and sub-national systems.

Which industries would be particularly relevant to consider for an expansion of CBAM to new sectors?
The report highlights organic chemicals and polymers as key candidates for CBAM expansion, due to their high emissions intensity, strong trade exposure and leakage risk. It also emphasises downstream products that incorporate CBAM-covered inputs (e.g. machinery and components with high iron, steel or aluminium content),

where extension of CBAM could close loopholes and reduce incentives to circumvent the mechanism. More broadly, several ETS-covered sectors – such as glass, ceramics, oil refineries, pulp and paper, lime and other metals – are identified as relevant in discussions about future alignment between ETS and CBAM.

How could CBAM influence the green transition in Finland, Sweden and Denmark in the long run?
CBAM strengthens the price signal for embedded emissions, shifting demand away high-emission imports towards EU production with lower average emission intensity, while total EU emissions remain capped under the EU ETS. For the Nordics, where CBAM-covered industries often have below-average emission intensity and ambitious climate targets, this can redirect investments into low-carbon technologies and support expansion of cleaner production. With the EU ETS cap, emissions are fixed at EU level and tend to move to installations with the highest "utility of pollution"; if Nordic heavy industries are relatively efficient, CBAM can accelerate a relocation of production – and associated emissions – towards the Nordics while overall EU emissions remain capped. Over time, this supports a green industrial transition, but it does not remove underlying structural challenges such as high energy and wage costs or export competitiveness outside the EU.

What potential positive effects could CBAM have from a Nordic perspective?
From a Nordic viewpoint, CBAM can:

- Reduce carbon leakage and strengthen the competitive position of low-carbon producers in iron/steel, aluminium, cement and fertilisers;
- Create an even playground so that clean production, from for instance the Nordics, can compete on equal terms with production abroad;
- Improve welfare in the Nordics through terms-of-trade gains and reinforce incentives for clean technology investment; and
- Provide more detailed emissions data that can enhance models of consumption-based emissions. In addition, greater harmonisation of methodologies and data standards across countries would improve comparability between models and strengthen the analytical basis for assessing consumption-based emissions.[2]

Overall, modelling and literature reviewed in the report suggest modest macroeconomic impacts, but a gain in sectoral competitiveness for the Nordic scope countries, particularly in CBAM-exposed industries.

What conditions must be met for CBAM to function effectively?
Effective CBAM depends on several conditions identified in the report: a robust

2. Consumption-based emissions models involve important trade-offs between coverage, granularity and timeliness. Economy-wide multi-regional input–output (EE-MRIO) models ensure internal consistency and broad supply-chain coverage, but rely on aggregated data and are subject to time lags. More granular data sources, such as shipment-level or firm-level trade data, can improve detail but are methodologically challenging to integrate due to differences in data frequency, system boundaries and classification standards.

EU-level registry and pricing system; clear rules for recognising third-country carbon pricing and avoiding double counting; gradual phase-out of free allowances to maintain environmental integrity; and a scope that limits leakage opportunities (including possible expansion to indirect emissions and downstream products). At national level, functioning implementation requires well-defined competent authorities, adequate administrative capacity, strong guidance and support for companies, and IT systems that work reliably. Industry interviews in all three Nordic countries underline that unclear guidance, tight timelines and registry problems can significantly undermine the mechanism in practice. The CBAM Regulation largely fulfils the formal conditions required for effective functioning by establishing a harmonised EU-level system aligned with the EU ETS, but its effectiveness in practice depends critically on implementation quality, administrative capacity, clear guidance, and the timely resolution of operational challenges during the transition phase.

How will CBAM affect industries that are strongly represented in the Nordic countries in both the short and long term?
In the short term, CBAM produces modest macroeconomic impacts but more pronounced sectoral effects: increased production costs and lower output in many downstream industries, but gains in competitiveness for CBAM-covered sectors in the Nordics. Modelling results in this report show that Denmark, Finland and Sweden experience little adverse macro impact, while their covered sectors generally gain total competitiveness relative to more carbon-intensive producers. In the long run, expanding CBAM (e.g. to indirect emissions and additional sectors) would reinforce protection for low-emission Nordic industries but increase cost pressures on importers and on Nordic firms heavily integrated into global value chains, particularly export-oriented producers facing international competition without export adjustment mechanisms. The European Omnibus regulation is expected to keep 99% of emissions within scope while exempting about 90% of importing firms, reducing administrative burdens especially for SMEs while largely preserving incentives for large importers to switch to lower-emission suppliers.

What administrative arrangements have Finland, Sweden and Denmark implemented for CBAM, and which authorities are responsible for its execution?
All three scope countries have established national administrative models that combine a national competent authority with customs administration:

Denmark has designated the Danish Energy Agency as national competent authority, supported by the Danish Business Authority and the Danish Customs Agency in a tripartite arrangement. The Energy Agency leads on reporting oversight and enforcement, Customs handles registry access and notifications, and the Business Authority processes applications to become authorised CBAM declarants. Denmark also finances administration via an annual fee for authorised importers.

In Finland, Finnish Customs (Tulli) has two roles, both as the customs authority (checking CBAM goods at the border) and as the national competent authority (NCA) for CBAM. In the role of NCA, Finnish Customs provides company guidance, manages access to the registry, grants authorised declarant status, checks CBAM compliance at import and carries out audits and sanctions under the national CBAM implementation act.

Sweden has designated the Swedish Environmental Protection Agency as national competent authority, working closely with Swedish Customs. The Environmental Protection Agency handles guidance, reporting, authorisation and enforcement, while Customs checks at the border whether goods fall under CBAM and whether the importer holds authorised declarant status. Both authorities provide extensive support and information tools for companies.

How might CBAM impact consumption-based emissions in Finland, Sweden and Denmark, and can current calculation systems account for these changes?
CBAM is expected to reduce Nordic consumption-based emissions over time by raising prices on carbon-intensive imports, promoting substitution towards lower-emission suppliers and EU production, and encouraging exporters to decarbonise to maintain EU market access. However, the immediate quantitative impact on national CBA figures is limited because CBAM currently covers only a narrow set of sectors. Existing Nordic CBA systems are based on hybrid EE-MRIO models using EXIOBase, which can capture broad shifts in trade and consumption but are not designed for the highly granular, installation-specific data generated by CBAM, and often rely on older statistics. CBAM has strong potential to improve data quality and granularity in these models, but this will require methodological adaptation, harmonisation of data systems and additional resources.

4.2 Policy recommendations for Nordic countries

Building on the findings of the report, the following directions for Nordic policy are suggested:

Prepare strategically for inclusion of indirect emissions
Nordic governments should assume that CBAM may be expanded to cover indirect emissions more broadly and support electricity-intensive industries in improving data systems and documenting low-carbon electricity use. This would allow Nordic producers to fully benefit from their cleaner power mix and mitigate the potential competitive disadvantages associated with high electricity costs.

Engage actively in the design of third-country crediting rules
Given the importance of deducting third-country carbon prices, Nordic countries should actively engage in EU processes that define methodologies for recognising external carbon pricing – including indirect emissions – to ensure robust, transparent and administratively feasible rules. Clear frameworks are needed to

avoid both double charging and loopholes, and to maximise incentives for third countries to adopt effective carbon pricing schemes.

Prioritise key sectors for CBAM expansion
Nordic policy positions should emphasise expansion of CBAM to sectors where the environmental and competitiveness gains are likely to be greatest: organic chemicals, polymers, and selected downstream products with high embedded emissions, alongside continued coverage of iron/steel, aluminium, cement and fertilisers. Attention should also be paid to ETS-covered sectors that are important in Nordic value chains (e.g. glass, pulp and paper, lime), while acknowledging higher administrative and legal risks associated with a broader scope.

Use CBAM as a lever for the green industrial transition
Nordic governments can treat CBAM as part of a broader low-carbon industrial strategy: aligning it with support for low-carbon technologies, infrastructure and innovation in heavy industry, and using the strengthened price signal to justify investments in "fossil-free" production. At the same time, policies should address vulnerabilities in downstream and export-oriented sectors, including monitoring carbon leakage risks to non-EU markets and following EU debates on export rebates or similar mechanisms.

Consolidate and streamline national implementation
Finland, Sweden and Denmark should continue refining their administrative arrangements to reduce complexity for companies while maintaining robust enforcement. This includes:

- Clarifying points of contact where responsibilities are split across agencies;
- Ensuring sufficient resources for competent authorities and customs;
- Maintaining and improving guidance, helpdesks and digital tools; and
- Learning from cross-Nordic experiences to identify effective implementation models.

These steps respond directly to industry concerns about administrative burden and inconsistent communication.

Strengthen links between CBAM and consumption-based accounting
Nordic statistical and environmental agencies should explore how CBAM shipment-level emissions data can be integrated into existing hybrid EE-MRIO models to improve estimates of consumption-based emissions. This will likely require methodological work, data harmonisation and careful assessment of costs versus benefits, but offers a path towards more accurate, policy-relevant CBA indicators that better reflect trade policy instruments such as CBAM.

Safeguard Nordic competitiveness while pursuing higher ambition
Finally, CBAM should be seen as one element in a broader mix of climate and industrial policies. The report indicates that Nordic economies are comparatively

well positioned but still constrained by high structural costs. To turn CBAM into a durable advantage, Nordic countries may need to combine the mechanism with stable long-term climate targets, targeted sectoral support, and efforts to build resilient, low-carbon value chains that are less vulnerable to volatile international trade dynamics.

5. CBAM and the green transition in the Nordics

CBAM is not a climate mitigation instrument in itself, but a trade-related mechanism designed to support the EU ETS by preventing carbon leakage. While the EU ETS caps total emissions within the EU and thereby drives the green transition, CBAM influences the carbon content of imports and may affect trade patterns and competitiveness, with indirect implications for industrial investment and production location. CBAM aims to mitigate carbon leakage within the EU by putting a price on imported goods covered by the regulation, making importers pay a levy equal to the EU-ETS price. It aligns the price of the embedded carbon content with the price of EU-ETS quotas to level the playing field between European and third-country producers. Taking trade data from 2022, only 3% of EU imports from non-EU countries are covered by the CBAM sectors, but were estimated to represent 0.31% of global GHG emissions in 2022 (OECD, 2025a). As such, the CBAM covers a small part of the overall trade, but targets sectors with relatively high embedded emissions and may therefore have a disproportionate impact on emissions embodied in international trade.

For Finland, Sweden and Denmark, the established focus on low-carbon technology in the production processes of the CBAM covered sectors shows potential for these sectors to improve relative competitiveness, reflecting lower emission intensity in CBAM covered production. However, any resulting emission reductions are determined by the EU ETS cap rather than by CBAM itself. The impact of CBAM will likely result in a shift in trade balances, reducing imports of CBAM covered (emissions intensive) products to the EU. However, the sectoral importance differs between the scope countries, meaning that some have more primary production than others, suggesting different level of impacts on the covered sectors. In addition, the Nordic countries have high input prices compared to the rest of the EU, which means that the impact on national production levels will depend on the carbon price. There may also be indirect effects for downstream users of CBAM products, as well as potential impacts on technological development and substitution patterns over time.

The next section will touch upon the overall position of Finland, Sweden and Denmark in terms of exposure, competitiveness and map out sectoral considerations for the scope countries.

5.1 Key mechanisms and macroeconomic impacts of CBAM

With the phase-out of free allowances under the EU ETS, European companies are at risk of losing business to carbon-intensive production in countries with little to no regulation, which will both increase global emissions and decrease the relative competitiveness of European companies. Before the introduction of CBAM, there was a risk of highly energy-intensive sectors included in CBAM relocating emissions to less regulated and therefore more economically profitable countries which would cause carbon leakages and economic losses for the regulated country (Kittel & Fahl, 2025). The intention of the CBAM is to send a price signal through the value chain, as the policy disproportionally increases the price of emission intensive inputs which will encourage firms to reduce the financial burden of the policy through greening of production processes (OECD, 2025a).

The enhanced price signals caused by CBAM can redirect investments back into European countries, as the national and European adopted climate targets and emission taxation of CO_2 emissions under EU ETS have been encouraging industries to green their production and develop and apply low-emission technologies for years now (Kittel & Fahl, 2025). This could improve the relative competitiveness of producers with lower emission intensity, including some Nordic industries, depending on sectoral composition and trading partners rather than on systematically different import patterns (FIW, 2024; OECD, 2025a). Highly trade-exposed industries with high emission-intensity, where production technologies vary significantly will be most affected by the policy, as it will cause a significant price gap between clean and high-emission production processes (Zhong & Pei, 2022), as illustrated in figure 1 (CO2 IQ, 2025).

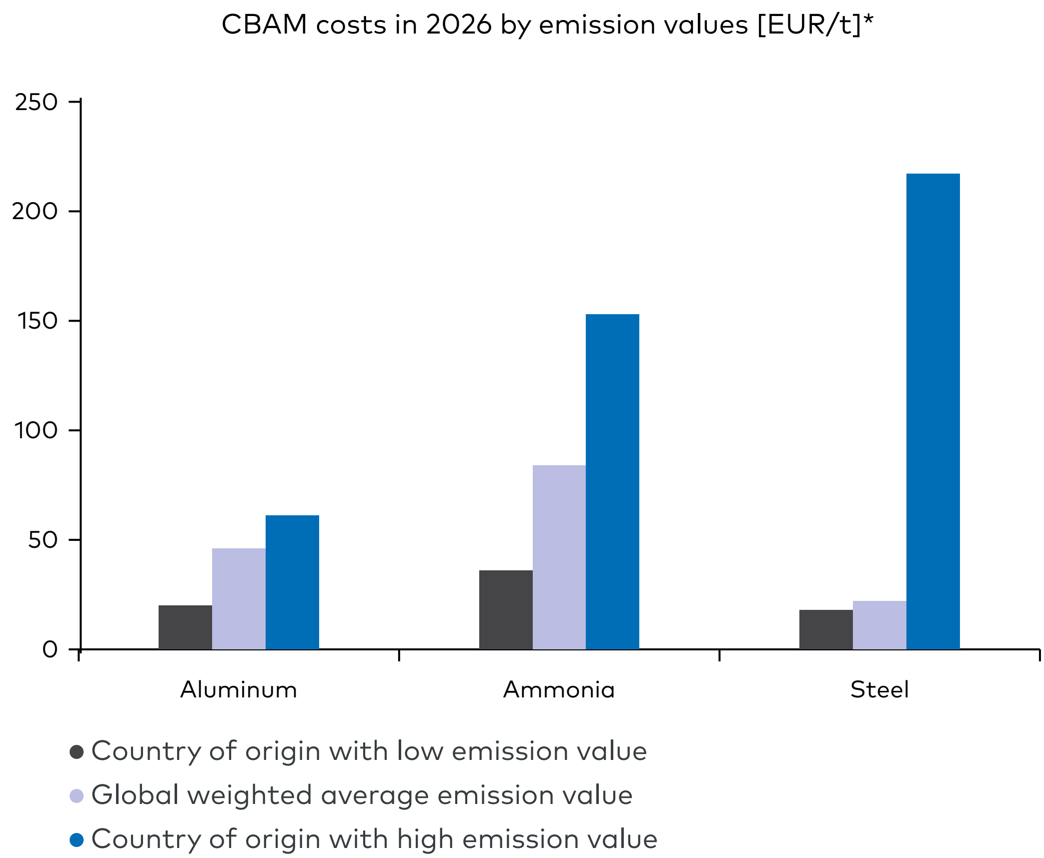


Figure 1. Differences in cost of CBAM products (CO2 IQ, 2025)

*At average EU-ETS price 2024: 65 EUR/tCO2

The price signal will increase with rising quota prices following the planned reduction of quotas under EU ETS, which will accentuate price differences between clean and 'dirty' production. Incentives to direct production towards less carbon-intensive countries, such as the Nordics where strict environmental regulations in many cases have caused CBAM industries to have lower-than-average CO_2 emission intensity, will thus increase. In figure 2, the added costs of CBAM for all three scope countries and sectors show that with an ETS price of 72.8€/ton, Finland, Sweden and Denmark will only marginally be affected on their input prices due to CBAM, with the exception of iron and steel, that is modelled to expect price increases of up to 23.6%.

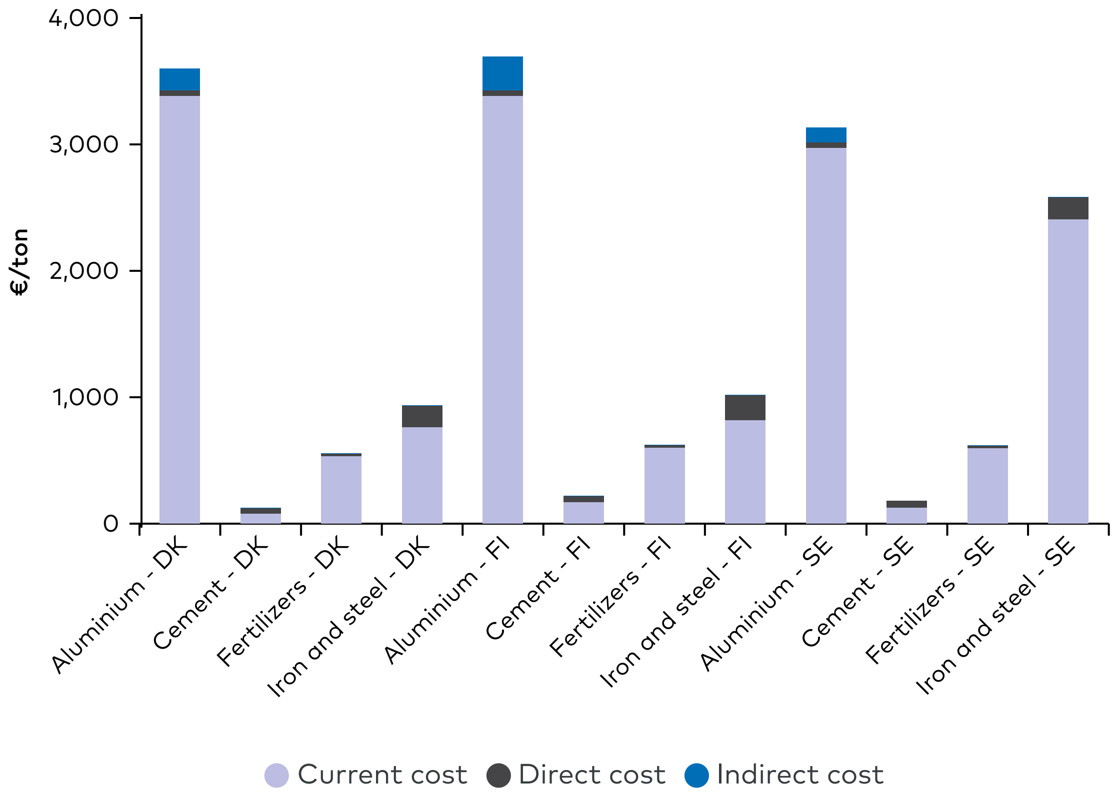


Figure 2. The effect on prices as impacted by CBAM in the scope sectors for all three countries

The size of the price signal is dependent on the value-added of the production process in which the CBAM-good is an input to. The CBAM tariff is placed at the very beginning of the value chain, which means that basic products and imports are most affected by the price increase. Highly processed high value added products will be relatively less impacted, as the CBAM input only constitutes a small share of the total value-added of the end product. As such, the size of the carbon fee relative to the total value-added of the product falls as you move up in the value chain (EsadeEcPol, 2022).

5.1.1 Fixed European emissions and shifting national emissions

With the EU ETS, companies that wish to increase production must either purchase emission certificates (thus removing them from the market) or shift production to a less emission-intensive manner. As such, any increase in production within EU countries associated with CBAM would occur under the constraints of the EU ETS and its carbon price, which provides the primary incentive for companies to adopt and implement low-carbon production technologies (Mendoza et al., 2024). CBAM does not reduce total EU emissions, which are determined by the EU ETS cap, but may influence where within the EU production takes place and which imports are displaced. While the policy caps the total emissions in the European Union, emissions will move to the producers with the highest utility of pollution, meaning companies that have a high output per pollution quota. This process will be further accentuated as free allowances are phased-out, and the subsequent rise in ETS prices. If the Nordic heavy industries have a higher-than-average utility of pollution, European pollution from CBAM industries might move to the Nordic countries.

5.1.2 Indirect cost compensation under the EU ETS

Under the EU ETS, Member States may grant compensation to certain electricity-intensive industries for indirect costs resulting from higher electricity prices caused by carbon pricing. This so-called indirect cost compensation aims to mitigate carbon leakage risks for sectors that are both trade-exposed and electricity-intensive. The compensation framework is governed by EU State aid rules and applies only to eligible sectors listed by the European Commission.

Importantly, indirect cost compensation is implemented at national level and varies across Member States in terms of coverage, generosity and budgetary allocation. As a result, the extent to which electricity-related ETS costs are passed through to industrial consumers differs significantly across countries.

For the Nordic countries, the relevance of indirect cost compensation varies. Finland and Sweden have implemented indirect cost compensation schemes for eligible sectors, while Denmark has historically applied more limited compensation. These schemes reduce the effective electricity-related carbon costs faced by industry and therefore play a decisive role in determining competitiveness impacts related to indirect emissions.

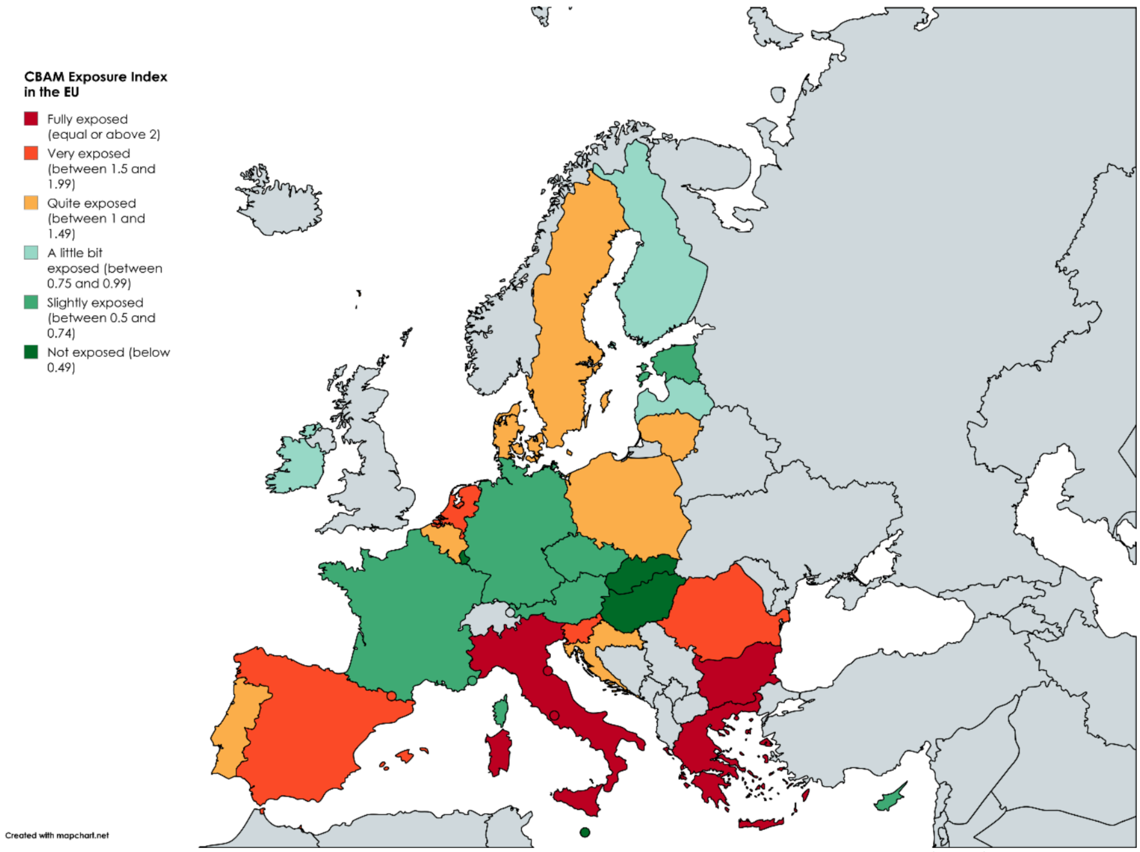
Consequently, the potential effects of including indirect emissions in CBAM on industrial competitiveness depend not only on electricity prices or the carbon intensity of power generation, but crucially on whether and to what extent indirect ETS costs are compensated at national level. This institutional feature is therefore more influential for competitiveness outcomes than differences in electricity generation mixes alone.

5.1.3 CBAM exposure index

How exposed each country is to the implementation of CBAM depends on two main factors:

1. the reliance on imports from CBAM-covered sectors, and
2. the scale of these imports relative to the size of the economy, measured by GDP.

The SPES project (SPES2025) uses these indicators to develop a CBAM short-term exposure index (Figure 3). The countries included in this study are all moderately exposed. Among them, Denmark shows the highest score, indicating a stronger dependence on industries affected by CBAM compared to Finland and Sweden. This suggests that while these sectors are present in the Nordic countries, they are relatively well positioned to adapt—either by diversifying or by shifting towards cleaner energy sources (SPES, 2025).



Source: Created with MapChart.net with data elaborated by the authors, based on Eurostat (2025)

Figure 3. CBAM short-term exposure index. When red or orange, the Member State is likely to suffer more from implementing CBAM; when green or light green, the EU country is less exposed to the mechanism's direct effects (SPES, 2025)

However, In a study by Amendola, (2025), results showed that the intra-competitiveness of the European Union was unevenly distributed, with the Nordic countries showing a very small decline in GDP and Portugal and the Eastern European countries showing the highest loss in GDP. The same study showed that the Nordic countries have a low percentage change in production prices, compared to the rest of the EU countries, proposing a lower degree of exposure than SPES (2025).

5.2 Competitiveness in upstream and downstream industries

CBAM is expected to have two major effects on competitiveness; 1) Upstream effect: EU producers of goods covered by the CBAM (steel, aluminium, fertilizers etc.), can more easily compete on the EU market since imported materials will need to pay for embedded emissions. EU producers may hence increase their market share in the EU, see Figure 4. Exporters of materials covered by the CBAM are, however, not protected; 2) Downstream effect: EU producers of goods that are not included in the CBAM, but use significant amount of materials that are included (for instance vehicles using steel and aluminium or agricultural goods using fertilizers), will need to pay more for feedstock, thus making their products somewhat more expensive (The price increase on downstream products will however be much smaller than the price increase on materials included by the CBAM). The market share of downstream products in the EU may therefore decrease while imported goods may increase their market share due to lower production costs. Since EU produced goods using CBAM-included materials will become more expensive this may have a negative effect on exports. This could potentially lead to leakage - that EU producers move production outside the EU and that these products are imported. A remedy against this would be to include downstream products at risk (for instance vehicles and some agricultural products), in the CBAM scheme. This would, however, increase the complexity of the CBAM system.

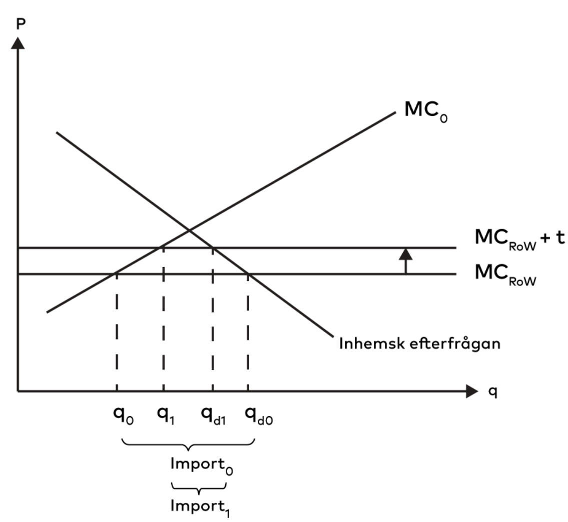


Figure 4. Effect on imports and consumption by introducing a CBAM (Dahlqvist et al., 2025)

In figure 4, MC_0 is the marginal cost of production in the EU; "Inhemsk efterfrågan" is the EU demand for the product; and MC_{ROW} is the marginal cost of production in the world. We assume here that the world price is not affected by the EU. Without a CBAM, the EU will consume qd_0, out of which q_0 is produced in the EU and $qd_0 - q_0$ is imported ($Import_0$ in the Figure). With a CBAM, the world cost increases to $MC_{ROW}+t$, consumption will be reduced to qd1 of which q_1 is produced in the EU and $qd_1 - q_1$ is imported ($import_1$ in the Figure) . In summary, the introduction of CBAM reduces total EU consumption of the product and simultaneously increases the share produced within the EU. As the cost of foreign production rises due to the carbon levy, imports decline, and domestic production becomes more competitive. This illustrates the core economic mechanism of CBAM: shifting demand toward lower-emission EU production while reducing reliance on carbon-intensive imports.

CBAM can address the competitive disadvantage of the European heavy-industry sectors relative to third countries' sectors, caused by carbon pricing under EU ETS by aligning the price of embedded carbon in imports with the European carbon price, and thereby reducing the risk of carbon leakages. CBAM currently mainly covers basic materials in the value chain. This means that an analysis of the effects of CBAM roughly can be split in two: competitive gains in sectors covered by CBAM and production price increases in sectors downstream from the CBAM sectors.

5.2.1 Sectoral impacts of CBAM: Covered vs. downstream sectors

Industries covered in this study may see improved competitiveness where domestic production has lower emission intensity than that of imports from high-emission third countries. This effect depends on product composition and trading partners rather than on systematically different import patterns in the Nordic countries. When carbon pricing is introduced, the Nordic industries will be well positioned to supply low-carbon CBAM goods, which will boost competitiveness and therefore domestic production in the covered industries. An analysis by OECD (Dechezleprêtre et al., 2025) estimates that CBAM mitigates the economic impact of EU ETS, but only partially so; value-added losses caused by EU ETS in CBAM industries are reduced from -1.06% to -0.85% with CBAM. The reduced competitiveness in spite of the implementation of a Border Carbon Adjustment can be attributed to the fact that CBAM industries also consume CBAM-covered inputs and that downstream industries face increased production costs (A. Dechezleprêtre et al., 2025).

Downstream sectors encompass EU based companies that utilize CBAM-covered goods in their production process, such as wind turbine manufacturers importing steel for production. These non-covered sectors face increased production costs as prices of intermediary inputs rise, some of which will be passed onto customers (at least in the short run), resulting in a value-added loss and deterioration of competitiveness. This effect is small, but affects firms that make up 85% of the EU economy (OECD, 2025b). As a result of the price increase of CBAM goods, they might redirect consumption to domestic markets, as these have become relatively cheaper (Dechezleprêtre et al., 2025).

The positive effects of CBAM on covered industries are more pronounced than the negative effects on downstream industries, but the larger gains are distributed among a smaller number of covered firms than the smaller adverse downstream effects. As such, losses in downstream sectors almost perfectly balance out the gains in covered industries according to (OECD, 2025b). The opposing effects show on the sectoral level, too. For the iron and steel industry, which is covered by CBAM, losses resulting from the phase-out of free allowances under the EU ETS are almost three times lower with CBAM (-2.98% in value-added to -1%). These gains are contrasted by losses in the construction and machinery industry, which are among the most adversely affected (OECD, 2025b). The construction and machinery industry is a direct downstream industry from the iron and steel industry, and CBAM therefore raises production input costs, in some cases significantly. Because of this, it's no surprise that covered industries typically lobby for a swift implementation of CBAM, while downstream sectors remain more critical of the policy. Figure 5 Illustrates this dynamic exemplified with iron and steel.

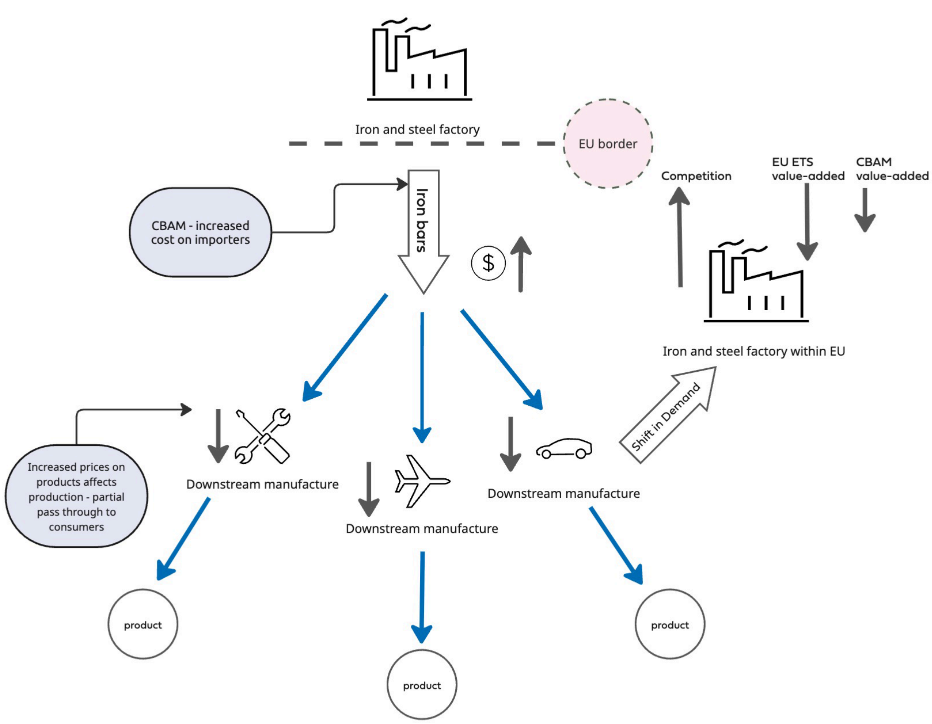


Figure 5. Illustrates the impact of CBAM across the value chain

5.2.2 Short-term and long-term perspectives

In the short term, economic adjustment is typically limited: factor inputs such as labour and capital, as well as technology, are largely fixed or only minimally flexible (Kenton & Potters, 2024). In contrast, the long-term perspective assumes that markets and production methods will adapt, with strategic changes focused primarily on maximising profits after the initial policy shock (Grant et al., 2023). Notably, the timeline for shifting from the short to the long run varies among producers, firms, and economies, depending on their size, ability to achieve economies of scale, and baseline technological capabilities—all of which influence how quickly they can move beyond the constraints of fixed inputs.

As CBAM directly influences the input prices of covered goods for EU producers, the short-run perspective primarily concerns shift in supply and demand through price mechanisms. In the short run, market conditions in upstream and producing sectors are likely to improve, as there is reduced competition in the production of CBAM-regulated goods. As a result, both CBAM producers and the suppliers of their intermediate inputs may benefit. However, it is noteworthy that this dynamic works to (partially) offset the negative impact associated with rising climate policy costs.

In the short run, downstream producers have limited ability to respond by altering their production processes or substituting intermediate products that are less affected by CBAM regulations. As a result, these sectors are likely to experience more significant negative impacts.

The extent to which increased downstream production costs are absorbed by the companies themselves, passed on to buyers, or shifted back to upstream industries depends on the relative elasticities of supply and demand along the value chain. The increasing prices will likely motivate intermediate input and consumption substitution towards less emission intense goods, as current input prices for producers importing emission-intensive CBAM products from non-EU countries will increase.

For the Nordic countries and less emission intensive production elsewhere, this means a competitive advantage, as their price on the market will be relatively cheaper than before. Additionally, sectors with low-carbon emission technologies will experience an increase in further investing in less-emission intensive technologies.

Long-run effects will depend on the adaptability of companies to the new regulation. In the long run, they might substitute inputs, collaborate with suppliers to green their production methods, develop and apply new technologies, use within-country reshuffling, backfilling and non-EU countries might implement new environmental laws (OECD, 2025b).

An example from the iron and steel sector, is the long-run adaptation from the Swedish steel production company SSAB, who is planning to shut down their blast furnaces (BOFs) and change their production to electric arc furnaces (EAFs), resulting in minimal carbon emission in their production by 2026 (SSAB, 2025). According to SSAB, this is a reaction to increased demand for sustainable steel production from companies, who want to label their products as low-emission products. According to Wu et al., (2023) investment in substitution of BOFs to EAFs in the steel industry is globally rising, partly as a reaction to the CBAM, indicating a global willingness to invest and adapt. Wu et al. (2023) estimate, that the share of EAFs in global steel production will increase from 28% in 2023 to 50% by 2050.

How much this will challenge the position of the Nordic countries as pioneers in low-carbon technological advancement, and thus their competitive advantage, depends on the level of further R&D investments, the effect of knowledge spill overs and the demand for continuously more low-carbon technology in the future (Miremadi et al., 2019). While Nordic companies might gain a competitive edge in the short and medium-term due to their lower emission-intensity of production, their production costs are still among the highest compared to the rest of Europe, with the scope countries positioning well above European average (Eurostat, 2025b). This might influence the Nordic countries competitive advantage in the long run, as countries with lower production costs have an incentive to increase public R&D and implement low-carbon measures, potentially gaining a greater share of the market.

Finally, it is important to note that the regulation is evolving gradually, initially manifesting as expectations of stricter policy and immediate administrative costs, with direct trade costs only arising at a later stage. Already now, reporting related to the CBAM can result in significant administrative costs for downstream companies importing the products. Obtaining and updating information on greenhouse gas emissions generated in the manufacture of countless products in different countries can be highly challenging. This could potentially influence trade significantly between the EU and third countries.

5.3 Implications for third countries and a just transition

Beyond its impacts within the EU, CBAM has important implications for third countries and global trade. These aspects are central to the environmental integrity and legitimacy of the mechanism and are discussed in this section.

5.3.1 Low-income countries

An important perspective in the discussion of CBAM concerns its implications for third countries, in particular low-income and capacity-constrained economies.

While CBAM is designed to prevent carbon leakage and support the effectiveness of the EU ETS, it may also affect countries whose export structures are shaped by existing trade dependencies and limited access to capital and low-carbon technologies.

From the perspective of environmental integrity and the long-term legitimacy of CBAM, it is therefore essential that the mechanism is accompanied by policies that support a just transition at the global level. Without complementary measures, there is a risk that CBAM disproportionately affects countries with limited financial and technological capacity to decarbonise production, potentially reinforcing existing global inequalities.

These concerns have been repeatedly raised in international climate negotiations, including under the UNFCCC and at recent COP meetings, where the importance of climate finance, technology transfer and capacity-building has been emphasised as central to enabling developing countries to participate in the global transition. In line with these discussions, several EU Member States, including Sweden, have highlighted the need for the EU to use trade policy as a tool to support global decarbonisation while strengthening climate-related development assistance and investment frameworks.

Strengthening and better targeting climate finance, technical assistance and investment support for low-income countries could help ensure that CBAM contributes to global emissions reductions rather than merely shifting trade patterns. Such complementary measures may also enhance the legitimacy of CBAM and support its stated objective of encouraging cleaner production practices beyond the EU.

5.3.2 Global trade flows, carbon leakage risks and international coordination

Beyond its effects on the EU and individual Member States, CBAM also has implications for international trade flows and global carbon leakage risks. While the mechanism is designed to prevent carbon leakage into the EU, there remains a risk that production of carbon-intensive goods could shift to regions without carbon constraints and be redirected towards non-EU markets, rather than leading to global emission reductions. Addressing this risk is essential to ensure that CBAM contributes to environmental integrity at the global level, rather than merely redistributing emissions geographically.

From a strategic perspective, preventing global carbon leakage requires complementary international engagement alongside CBAM. This includes encouraging third countries to develop and implement their own carbon pricing mechanisms or equivalent climate policies, thereby reducing asymmetries in carbon costs across markets. In this respect, CBAM may serve as an external incentive for climate policy adoption, but its effectiveness depends on broader international coordination rather than unilateral EU action alone.

The EU and Nordic countries can support this process through a combination of trade policy, climate diplomacy and targeted support measures. These may include technical assistance, capacity-building and climate-related investment support to help third countries develop carbon accounting systems and low-carbon production technologies. Such efforts are increasingly discussed in international forums, including under the UNFCCC, and are consistent with EU and Swedish policy objectives to use trade policy as a lever for global decarbonisation.

Strengthening international coordination on carbon pricing and climate policies could also reduce the need for export support mechanisms for EU industries subject to the EU ETS. As long as carbon cost asymmetries persist, there may be continued pressure to compensate EU producers facing higher carbon costs, particularly through transitional and temporary support measures. Over time, broader international adoption of carbon pricing would help level the global playing field and reduce reliance on such compensatory instruments. For the Nordic countries, which are highly trade-exposed and strongly integrated into global value chains, these international dynamics are particularly relevant for the long-term effectiveness and legitimacy of CBAM.

5.4 Impact on national trade and emissions

CBAM increases prices of imports of emission-intensive products, and thus eliminates the possibility of substituting EU products subject to carbon prizing with cheaper, more emission intensive imports from unregulated regions (Kittel & Fahl, 2025). The tariffs result in an increase in demand for intermediate emission-intensive products produced in the EU, which drives EU companies to specialize in carbon intensive-industries, which can increase emissions nationally (Mendoza et al., 2024). This means that production is expected to shift from countries with more emission-intensive production to countries with low CO2 emission intensity. While this is anticipated to result in a reduction in overall CO2 emissions, this could mean a small and temporary increase in national emissions in the Nordic countries, if their emission intensity of production is lower than the EU and world average.

As the policy puts a price on carbon emissions, trade balances likely will shift globally – imports to the EU will be reduced, while the consumption of EU-produced products will increase. Third country trade partners which might have had lower production costs (not including the carbon cost) than the EU average, might lose or decrease their cost advantages as a result of the carbon pricing induced by CBAM, as illustrated by figure 6. It is important to note, that while some production is expected to shift due to the price signal induced by the CBAM, overall consumption is likely expected to lower to some degree, due to the increase in prices on CBAM products (Cammeo et al., 2025).

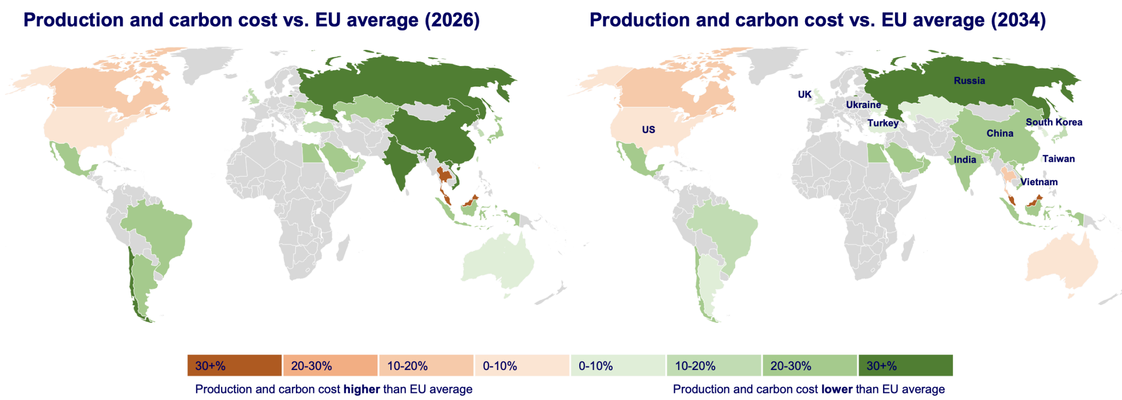


Figure 6. Shows how as CBAM is phased in, cost advantages shift toward countries with lower emission intensity of production (Wood Mackenzie, 2023a)

The Nordic countries have, in some cases significantly, higher industrial production costs than the EU average due to higher wages (Eurostat, 2025b), higher land prices, and more stringent regulation (CCPI, n.d). For CBAM to significantly increase production in the Nordics, the carbon price must be high enough to considerably shift demand to low-emission production, in which case the Nordic countries will have a comparative advantage despite higher production costs. In these cases, the Nordic countries may benefit from early investments in low-emission technologies and industrial innovation, supported by EU-wide climate regulation under the EU ETS as well as national energy and innovation policies. While emission standards for CBAM sectors such as iron and steel are largely harmonised at EU level, some Nordic producers have been early movers in adopting low-carbon production technologies, which can translate into a comparative advantage at higher carbon prices. Therefore, higher carbon prices can increase demand for Nordic heavy industry production despite their relatively higher production costs.

5.4.1 Export rebates

As the current design of CBAM only covers imported goods, companies importing carbon-intensive intermediate goods for production will experience a decrease in competitiveness when exporting outside of the EU. This leads to an increased risk of carbon leakage for EU-producers. Economic analyses have shown that expanding the mechanism to cover both imports and export could more effectively prevent carbon leakage (see e.g. Ambec et al., 2024; Cammeo et al., 2025). Since

CBAM increases production costs in the EU, export companies could be offered compensation or a refund for emissions costs to compete fairly in international markets. This could mean partial refunds of carbon costs to companies exporting to countries without carbon pricing. However, including exports in the system could bring additional legal challenges in complying with WTO rules (Kuusi et al., 2020).

In July 2025, the European Commission announced a plan to address the risk of carbon leakage for exporters in CBAM. The proposal was expected to be made by the end of 2025, but was not yet made public by the finalisation of this report.

5.5 Sector-specific considerations

This section examines how CBAM affects key emission-intensive sectors in Finland, Sweden and Denmark—fertilizers, iron and steel, aluminium, and cement. The analysis focuses on trade exposure, emission intensity, and sectoral readiness for decarbonisation, while also outlining how CBAM may influence competitiveness and investment decisions. The depth of analysis varies across sectors and countries, reflecting differences in economic relevance and the availability of sector-specific data in the Nordic context.

5.5.1 Fertilizer

Fertilizer production is one of the most energy intensive industries in the world, being responsible for 3%–5% of global natural gas consumption every year (Song et al., 2018). CBAM includes five categories of fertilizers: nitric acid, ammonia, potassium nitrate, mineral or chemical nitrogen fertilizers and compound fertilizers (Martinez, 2025). The EU has about 120 fertilizer plants, which accounts for 8% of global nitrogen production – about one third of this production is for export markets (Fertilizers Europe, 2023; Martinez, 2025). Despite this significant domestic production, EU imports 45%, 46%, and 58% of its consumed inorganic nitrogen, phosphates and potash nutrients respectively (Carbon Trust, 2025).

Low-carbon alternatives to the emission-heavy production processes exist, but due to higher production costs, the scale of these technologies is often limited. However, with the price signal from EU ETS, low-carbon technologies such as fertilizers based on green ammonia which is produced from hydrogen derived from decarbonized energy are expected to become more profitable, which will result in a scaling-up of production (Martinez, 2025). This scaling up will ultimately provide economies of scale and consequently lower costs and reduce emissions in the sectors value chain, while continuing to encourage innovation in lower-carbon technologies, which can provide innovative startups with business opportunities (Carbon Trust, 2025). However, these opportunities will also require investments and upfront costs, which means higher prices in the short term. Importers of fertilizers might either substitute current suppliers with lower-carbon alternatives or support existing supplies in decarbonizing production, in a process known as 'insetting'. This means higher prices in the short term, but in the long term these partnerships can enhance sustainability and supply-chain resilience, reduce the cost of CBAM certificates and improve the supplier's competitiveness while importers can gain reputational benefits due to positioning as leaders in a greener future (Carbon Trust, 2025).

The upstream/downstream effects described in section 3.2 are expected to be seen with the introduction of CBAM in the fertilizer sector, with the most prominent downstream sector being agriculture. Fertilizers represent about 6% of farmer input costs and up to 12% for arable crops farmers (European Commission, 2022b). Consequently, the agricultural sector could see rising prices from the increase in the price of fertilizers resulting from a carbon pricing on imports through CBAM, affecting farmers' margins and/or be passed along the value chain to processors, distributors and consumers (Martinez, 2025).

All three scope-countries have emission intensity of fertilizer exports that are lower than the EU average (although Denmark currently does not have any production plants) (Jacob Jensen & Ida Auken, 2024). Because of this, it is expected that EU market fertilizer demand will shift in favour of production in the Nordic countries, and that production is further encouraged to implement greener technologies.

Denmark

Denmark imports and consumes a significant amount of fertilizer, since the country has not had a domestic production of synthetic fertilizer since 2004 (Jacob Jensen & Ida Auken, 2024). However, Denmark do have some production of organic fertilizers, e.g. from the company Daka, that produces fertilizers from bonemeal from Danish farm animals (Daka, n.d). Between 2018 and 2022 Denmark imported an average of 15% of fertilizers from outside the EU, the majority of which came from the Russian Federation (Chatham House, n.d.-a). Since Denmark does not have any synthetic fertilizer production, no upstream industry gains in competitiveness from the price alignments provided by CBAM will be seen. Moreover, the impact on national production-based emissions will virtually be non-existing.

Finland

The Finnish fertilizer market has traditionally operated somewhat independently from the rest of Europe, relying mainly on domestic production and imports from Russia (Luukkonen, 2023). A significant challenge for the sector is the import of nitrogen sources, particularly ammonia, from abroad—especially from Russia—which renders Finnish fertilizer production highly dependent on foreign raw materials. Efforts to diversify import sources have aimed to improve both the supply and availability of fertilizers.

Finnish fertilizer CBAM imports were valued at €693 million from January 2022 to September 2024 (Kaitila et al., 2025), of which €66 million would likely be under the forthcoming CBAM, mostly products coming from Russia.

In a general equilibrium assessment (Kaitila et al., 2022), the authors forecasts a decrease in imports from non-EU sources, notably Russia, and a corresponding increase in intra-EU trade. The imports of fertilizers could decrease by several dozens of percent, depending on the carbon pricing and the inclusion of indirect emissions. Kaitila et al. (2025) shows that there is a significant decline in the trade of Fertilizers in the inception period of the CBAM 2023 q4 onwards, coinciding with the predictions of the pre-impact assessments. This effect may, however, partly reflect the war in Ukraine despite that the methodology controls for external factors. Finally, a survey for Finnish firms suggests that the future expectations of the producer firms are aligned with these changes (Kaitila et al., 2025).

The reduction in imports would likely lead to an increase in domestic production of fertilizers within the EU, including Finland. The modelling results suggest that the production of fertilizers in Finland could increase as domestic producers benefit from reduced competition from non-EU imports. The increased costs may lead to higher prices for agricultural products and reduced competitiveness for Finnish farmers (Sivill & Länsisalo, 2025).

Sweden

Sweden has no domestic production of fertilizers, and imports approximately 750,000 tonnes per year from mainly Germany, Poland, France and Spain. 22 percent is imported from Russia and Belarus (Naturskyddsföreningen, 2023). Since Sweden as Denmark does not have any synthetic fertilizer production, there is no upstream industry that gains in competitiveness from the CBAM price alignments. Moreover, the impact on national production-based emissions will be non-existing.

5.5.2 Iron and Steel

The iron and steel industry is one of the most energy- and emissions-intensive sectors globally, and accounts for 7–9% of global anthropogenic CO2 emissions, (Worldsteel, 2021). Steel is a cornerstone of construction, transportation, industrial equipment, and appliances, and is vital in the production of wind- and solar power (European Commission. Joint Research Centre., 2020). Due to this high strategic importance, iron ore (of which 98% is used in steelmaking) is classified by the European Commission as a 'critical raw material'. Although steel is highly recyclable and can be recycled many times without losing quality, global steel production has more than doubled between 2000 and 2018 (Springer & Hasanbeigi, 2019). This can be attributed to the high degree of global industrial and population development occurring over the past 20 years. The increase in demand and supply and subsequent increase emissions is therefore a critical focus of CBAM.

As mentioned in the introductionary chapter, most primary steel in the Nordics is produced via the BF–BOF route. EAF's are also present and increasingly used. The Nordic region currently hosts three integrated steel plants and a number of EAF-based facilities. Importantly, several Nordic steel producers have announced or initiated major investments in fossil-free steelmaking, positioning the region as a potential frontrunner in decarbonizing this sector. The Nordic steel market is distinguished by a strong emphasis on the production and export of high-quality, specialized steel products, while simultaneously relying on imports of lower-grade and commodity steel to meet broader domestic demand.

Steel production in the Nordic countries—particularly in Sweden and Finland—is highly advanced and capital intensive, with a focus on niche products, high-strength steels, and customized steel solutions for sec- tors such as automotive, engineering, and construction. These value-added steel products are primarily exported to European and global markets, supported by strong industrial R&D and investments in fossil-free steel technologies. At the same time, the Nordic region imports a significant share of lower-grade, mass-produced steel, such as rebar, standard coils, and sheets. These imports typically come from countries with lower production costs and environmental standards, including some outside the EU.

While the carbon price encourages a green transition of production, both domestically in the EU and in third countries, a price increase in downstream intermediary and end products is to be expected. While the price signal might encourage a green transition of the industry itself, iron, steel and aluminium are core components of the building blocks of the green transition, such as renewable energy infrastructure, electric vehicles and charging points. A price hike throughout the steel supply chain can therefore increase the cost of the European green transition, potentially slowing it down (Carbon Trust, 2025; Wood Mackenzie, 2023a).

Denmark

Unlike Finland and Sweden, Danmark has no domestic iron extraction or large heavy industries to sell steel to. Therefore, mass-scale production is less present, as high wages makes generalized mass-production costly. Because of this, the Danish metal industry is characterized by a strong focus on highly specialized niche production, where large multinational players might not be present due to the size of the market. The industry has specialized, automated and refined these niches and has thus been able to maintain competitiveness (Jern- og Maskinindustrien, 2019). The key players of the Danish steel industry Is NMLK Dansteel and Duferco Danish Steel. However, in June of 2025 the closing of Durfercos Danish production site was announced, as a result of almost two decades of economic deficiency (Nørgaard, 2025). The administrative director of Duferco adds that it is part of a European trend in the iron and steel industry that the rise of input prices are putting the industry at risk and force factories to close their production (Nørgaard, 2025). As of now, NMLK Dansteel is still in production, but as the main part of their import is from the Russian Federation, they will be necessitated to shift their imports by 2028, where EU sanctions against import of Russian products will take place (Dietrich et al., 2024).

Despite the high value-added nature of Danish steel products, the industry remains sensitive to increases in input prices. This vulnerability stems from Denmark's strong reliance on imported raw materials and semi-finished steel, as the country has no domestic iron extraction and limited large-scale production capabilities. The recent closure of Duferco Danish Steel in 2025 underscores this sensitivity, with rising input costs cited as a key factor behind the decision.

Since CBAM places a price on carbon-intensive imports—many of which originate from outside the EU—Danish producers are likely to face higher procurement costs than their Nordic counterparts. While niche production offers some competitive resilience, the industry may require access to low-carbon supply chains and supportive policy instruments to maintain its current position in specialised market segments.

Finland

The production of iron and steel in Finland is a significant industrial sector with a long tradition and a central role in the country's economy. Most of the output consists of steel products, which are widely used in construction, infrastructure, and various industrial applications. Finland's steel industry is shaped by two major producers, SSAB Europe and Outokumpu, both operating significant plants in Finland and aiming to contribute to the green transition. SSAB Europe produces carbon steel and runs Finnish plants in Raahe and Hämeenlinna, with annual employment more than 3,700 persons in Finland. Its global production capacity is about 8.8 million tonnes per year, and it specializes in advanced steels, strip products, and quarto plate. Although SSAB is a carbon-steel producer, it is also a frontrunner in developing fossil-free steel. Outokumpu focuses on stainless steel, with its Tornio plant employing around 3,000 persons and producing roughly 2 million tonnes of stainless steel per year. Outokumpu is the largest stainless-steel producer in Europe and the second largest in North America, and its production is strongly based on circularity, relying on recycled materials for about 95% of its inputs (Karvala, 2025).

According to Kaitila et al. (2025), import value in the iron and steel sector CBAM products stood at €6,070 million from January 2022 to September 2024, of which imports considered to be subjected to tariffs represent around 20%. Main non-EU exporters (according to 2021 data) were Russia (6.2%) and China (3%) (Kaitila et al., 2022). Overall, since 2021, there has been a decline in the imports of the iron and steel products to Finland.

Only a small share of the sector's production is exported (Berg-Andersson et al., 2025). In January 2025, exports of metal products were significantly lower than expected, shrinking by one fifth compared to the previous year. However, exports are anticipated to return to slow growth in 2025. In 2024, the most important export country was Sweden, with a share of 20 percent, followed by the United States at just under 7 percent. Indonesia's share was almost as large.

According to Kaitila et al. (2022) CBAM has substantial implications for the iron and steel industry, which is among Finland's highest emitters. The modelling results indicate that the imports of iron and steel products could decrease by several dozens of percent, depending on the carbon pricing and the inclusion of indirect emissions. The reduction in imports would likely lead to an increase in domestic production of iron and steel products within the EU, including Finland. The modelling results show that the production of iron and steel products in Finland could increase significantly as domestic producers benefit from reduced competition from non-EU imports.

Iron and steel serve predominantly as intermediate goods within machine manufacturing industries. The production costs—and consequently, the output prices—of goods produced by the engineering sector are expected to increase somewhat more than in other sectors due to the CBAM, according to Kaitila et al. (2022). As a result, exports of machine manufacturing are projected to decline to a greater extent than those from other industries, although the differences are not substantial.

This phenomenon is particularly evident in the observed reduction in electronics industry exports. It should be noted that these export impacts do not incorporate the effects of phasing out free allocation; should the removal of free allocation be considered, exports from Finland to regions outside the EU would likely decrease more than the estimates presented here.

Sweden

Sweden has three ore-based steel plants and eleven steel plants using only scrap iron. In 2024, Sweden produced 4.0 million tonne pig iron (0.2 percent of global steel production), of which 2/3 came from iron ore and 1/3 from scrap. For comparison, the EU produced 126 tonnes of steel and the world 1.9 billion tonnes of steel in 2023. Sweden's production focuses on high performing steel making it less sensitive to international competition than, for instance, construction steel. Most of the steel, 2.8 Mt, is exported. The value of the exported steel was in 2024 SEK 60.9 billion (EUR 5.5 billion), which accounts for 2.9 percent of Sweden's total export value. Approximately 67% of exported steel goes to the EU and Great Britain. The largest countries outside EU and UK to which Sweden exports steel are USA and China.

The transformation of Sweden's steel industry is currently in the emergence phase, where early technological breakthroughs, pilot projects, and experimentation are shaping a potential shift away from traditional coal-based production processes. While it is too early to assess the effectiveness of policy mixes, recent developments suggest that this transition has gained significant momentum. In 2016, SSAB—the largest Swedish steel producer—announced plans to replace coal with renewable hydrogen through the HYBRIT initiative, launched in collaboration with LKAB and Vattenfall. Since then, pilot-scale hydrogen-based direct reduction facilities have been developed and plans for full-scale production and hydrogen storage are progressing, with low-carbon steel deliveries targeted for 2026.

These efforts have spurred parallel initiatives from other steelmakers in Europe and new entrants like Stegra (formerly H2 Green Steel), which is investing directly in a full-scale greenfield plant using hydrogen-based steel production in Boden.

The EU ETS is the main policy instrument for transforming industry and with EU:s climate package Fit-for-55, the price of emissions allowances has risen to approximately 70 Euros per ton. With a price of 100 euros or more, low-carbon steel will be able to compete with traditional steel. Also critical for creating a favourable business case for low-carbon steel is that free allocation is phased out for traditional steel making (based on blast furnaces using coke and coal to reduce iron ore). This in turn depends on the phase in of CBAM. Without an effective CBAM in place there is a risk that European low-carbon steel production will not be able to compete with imported steel.

5.5.3 Aluminium

Aluminium plays a vital role in the production of solar- and wind energy, batteries, construction and transportation (Berg-Andersson et al., 2025). Demand for aluminium is projected to rise with almost 40% by 2030, partly driven by population growth and demand from the transportation, construction and energy sector (Aleksic & Vargas, 2023). Higher demand for aluminium in developing countries is also a contributing factor to the trend (Hasanbeigi & Springer, 2025)

Aluminium has a heavy impact on the climate, accounting for approximately 2% of total global carbon emissions (Hasanbeigi & Springer, 2025). Aluminium is produced from the raw material Bauxit, which is primarily mined in Australia, accounting for 30% of global production, and China accounting for 19% of global production (Farjana et al., 2019). Aluminium production can be categorized in two different production processes: The primary and the secondary production. Primary production includes refining and smelting of Bauxit ore to produce aluminium, whereas the secondary production includes the recycling of existing aluminium scrap. The primary aluminium production is highly energy intensive and 90–95% more emissions intense than the secondary production (Hasanbeigi & Springer, 2025). The smelting process, that includes alumina refinement and electrolysis, are the part of aluminium production that has the highest impact on the climate due to its high consumption of energy (Farjana et al., 2019). The smelting process accounts for almost 70% of the overall emissions generated in aluminium production (World Economic Forum et al., 2024). Although aluminium production is emissions intensive, the recycling of aluminium is very effective, and can be reused many times. According to Stena Recycling, 75% of all aluminium that has ever been produced, are still in use (Stena Recycling, n.da).

Denmark

Denmark has no primary production of aluminium, and imports all of its aluminium, with Norway, Sweden and Germany being the top exporters (Hasanbeigi & Springer, 2025). There is currently no official data on the Danish market share of aluminium, but the aluminium industry is a notable actor in the Danish industry. The Confederation of Danish Industries hosts "Aluminium Danmark" with more than 70 members from the Danish industry. The key player is the Norwegian company Hydro (with extrusion sites in Denmark). Hydro is the biggest aluminium producer in Norway and has two extrusion sites in Denmark, that makes aluminium profiles primarily for the Danish and German market (Hydro, 2025). They produce 25,000 tonnes of aluminium yearly and employ around 700 people in Denmark. The Danish aluminium industry is characterized by production of aluminium profiles and castings. As a significant portion of the Danish household electricity is covered by wind- and solar power, and as the Danish government are working towards 100% liability on green energy, the demand on aluminium in Denmark will likely rise with the demand of wind turbines and solar panels (European Commission. Joint Research Centre., 2020; Klima-, Energi- og Forsyningsministeriet, 2024a).

As Denmark does not produce primary aluminium domestically, Denmark will not experience CBAM-related competitiveness gains in upstream production. Instead, the effects of CBAM will primarily be felt in downstream manufacturing, where aluminium is processed into profiles and castings. Demand for aluminium is likely to increase significantly as Denmark expands renewable energy infrastructure, particularly wind turbines and solar panels. This could strengthen the role of the Danish aluminium sector in the green transition, but it may also amplify exposure to potential cost increases from CBAM-regulated imports. The industry may therefore require access to low-carbon aluminium supply chains or incentives for recycled aluminium to maintain competitiveness and support the deployment of climate technologies.

Finland

The projected growth in primary aluminium production in Finland is contingent upon the plans to establish a large-scale, low-carbon aluminium plant planned in Kokkola. Prior to the commencement of operations at this plant, Finland has not engaged in primary aluminium production; instead, the country has relied on imports of aluminium from abroad.

According to Kaitila et al. (2025), the aluminium sector's import value in CBAM products stood at EUR 1,920 million from January 2022 to September 2024, of which imports considered to be subjected to tariffs represent around 11%. Previously, China and Russia have been the main non-EU importers (Kaitila et al., 2022). Since the war in Ukraine, imports from Russia and China have declined, in favour of EU sources.

Based on the previous impact assessment that used a general equilibrium modelling, the reduction in imports would likely lead to an increase in domestic production of aluminium products within the EU, including Finland. The modelling results suggest that the production of aluminium products in Finland could increase as domestic producers benefit from reduced competition from non-EU imports. A survey for Finnish firms suggests that the future expectations of increase in production in Finland are neutral (perhaps reflecting the current situation with few domestic production), while there is an expectation of decline in production outside the EU. (Kaitila et al., 2025)

Sweden

Sweden has one producer of primary aluminium – KUBAL in Sundsvall – where aluminium is produced from aluminium oxide through electrolysis. The production capacity totals 135,000 tonnes of aluminium annually, which is 2 percent of the global production. Kubal is owned by Rusal a Russian aluminium producer (Rusal, n.d.). All produced primary aluminium from Kubal is exported. There are two Swedish producers/exporters of aluminium profiles and one exporter of rolled aluminium. These producers only use imported primary aluminium for their needs, not aluminium from Kubal (Frisk, 2025). Sweden recycles approximately 60,000 tonnes (Sveriges geologiska undersökning, n.d). In addition, Stena recycling produces 70,000 tonnes of aluminium from scrap (Stena Recycling, n.db)

There is no Swedish official data on imports and exports of aluminium for Sweden, the reason being that there are only 4 producers of primary aluminium and aluminium products in Sweden. Statistics Sweden is not allowed to compile aggregated data from firms if this would risk revealing firm specific data. Statistics on aluminium, copper and nickel does exist in aggregated form, but this cannot be disaggregated into separate metals. According to United Nations COMTRADE data base, Sweden imports primary aluminium and aluminium products worth approximately EUR 2 billion. Main countries of origin are China EUR 32 million; Italy, EUR 17.6 million; EUR Poland 16.3 million; and Germany EUR 15.6 million.

5.5.4 Cement

Cement is used to produce concrete, which is a crucial material globally in construction and establishment and maintenance of infrastructure. Cement manufacturing is one of the most polluting industries globally, accounting for about

6% of global CO_2 emissions (World Economic Forum et al., 2024). Cement is manufactured from raw materials, mainly limestone, that is transformed to clinker by a process that heats limestone to 1,450 degrees, making the process very energy intensive and releases carbon during the process, which accounts for 88% of the overall emissions related to the production of cement (World Economic Forum et al., 2024). Mitigating emissions in the production process is tricky and requires fundamental changes to the manufacturing process. However, several abatement technologies exist, such as Carbon, capture and geological storage (CCS), using hydrogen for heat, increasing biomass in the fuel mix and using non-fossil based supplementary cementitious materials (SCMs) (Cembureau, n.d; World Economic Forum et al., 2024). Cement is a dense and relatively cheap material, readily available worldwide. The cost of producing low-carbon cement is almost twice as high as producing traditional cement. However, the cost increase of, for instance, an apartment built with low-carbon cement is marginal – less than 0.5 percent (Rootzén and Johnsson). This is due to the fact that cement is a relatively cheap material that accounts for a minor part of the total cost of a building. As with low-carbon steel, a carbon price of 100 euros per tonne CO_2 or more would be required for low-carbon cement to be able to compete with traditional cement. In addition, a phase out of free allocation in combination with a phase in of CBAM is needed to avoid carbon leakage and imports of cement produced in a traditional way.

Only five percent of the world's cement production is traded on an international market. China accounts for 55 percent and India for 7 percent of the global cement production (Malaga, n.d). The low level of trade in cement is partly due to the non-viable trade-off between transportation costs and the unit value of good transported, unless it is bulk transported by ship (Cembureau, n.d).

In a proposal in favour of CBAM by The European Cement Association (CEMBUREAU, 2021), trade statistics of cement show a significant increase of imports from non-EU countries of 160% between 2016–2020. Cembureau note, that this probably is the product of a "New business model", where clinker is produced outside of EU, and then imported to grinding installations placed at the border. According to 2023 data from Eurostat, main importers of cement and clinkers into EU is Turkey (35.8%), Algeria (19.2%) and Ukraine (12.6%) (Cembureau, 2024). The leakage risk here, is applied to Algeria and Ukraine. Taking Ukraine as the example, looking at trade data, the trade flow between 2017–2022 for exports of cement from Ukraine has increased significantly (Chatham House, n.d.-a). Imports from Ukraine to four of its neighbouring countries namely, Poland, Romania, Hungary and Moldova has increased by respectively 70%, 48%, 37% and 29% in the period, indicating either a steep increase in demand or leakage of production (Chatham House, n.d). The introduction of CBAM will possibly show a shift in these trade flows.

Denmark

Denmark has one producer of cement, namely Aalborg Portland, that produces 2,363,000 tonne cement per year and is the largest industrial emitter in Denmark (Aalborg Portland, n.d; Innovation Fund, 2025). Approximately 1 Mt is exported.

The Danish export market of cement is within Europe, and Aalborg Portland has silo facilities in Belgium, France, Iceland, Norway, Poland, the Netherlands and the United Kingdom (Aalborg Portland, 2024). According to the 2024 ESG report from Aalborg Portland, the company decreased their scope 1 emissions by more than 260,000 tonnes CO2 in 2024 compared to 2023. (Aalborg Portland, 2024). In 2024 they emitted approximately 1.4 Mt CO2, which is equivalent to 3.7% of the Danish GHG emissions (Aalborg Portland, 2024; Danmarks Statistik, n.d). In march 2025, the company announced the granting of EUR 220 million from the EU Innovation Fund into the project ACCSION, that aims to develop a production system that can produce CO2 neutral cement by 2030, projected to abate 113% emissions over its first 10 years (Aalborg Portland, 2025; Innovation Fund, 2025).

Denmark's cement industry is highly concentrated, with Aalborg Portland as the sole producer and the country's largest industrial emitter. Since CBAM targets emission-intensive imports, the direct effect on Danish cement production will be limited, as exports are mainly destined for European markets and therefore exempt from CBAM. Instead, the main impacts will concern competitiveness and investment incentives. In this context, CBAM may act less as a threat and more as a strategic catalyst: it protects Danish cement from competition with cheaper, high-emission imports while simultaneously increasing pressure to accelerate investments in carbon capture and other abatement technologies. If Aalborg Portland succeeds in reaching near-zero emissions by 2030, as planned, the company could position Denmark as a frontrunner in low-carbon cement and benefit from increased demand once CBAM fully takes effect.

Finland

Most of the cement products used in Finland are produced domestically from Finnish limestone. The sector has reduced emissions by improving the energy efficiency of the firing process, developing fine particle filtration systems, and utilizing recycled fuels.

Currently, the industry suffers from low demand due to weakness of the construction sector business environment. According, to Kaitilia et al. (2025), CBAM product imports in minerals were €830 million, while trade under CBAM from non-EU countries made up less than 1% of the total imported cement sector trade value in the period from late 2023 to mid-2024. In 2021, almost all of the non-EU imports came either from the UK or Turkey (Kaitila et al., 2022). Finland exports very few of these products.

Based on the general equilibrium modelling in Kaitila et al. (2022), the CBAM would significantly reduce the imports of cement from non-EU countries. The reduction is primarily due to the high carbon intensity of cement production, which makes it subject to higher carbon tariffs under the CBAM. The reduction in imports would likely lead to an increase in domestic production of cement within the EU, including Finland. The modelling results show that the production of cement in Finland could increase as domestic producers benefit from reduced competition from non-EU imports. However, for Finland these effects are likely very small.

A survey for Finnish firms suggests that the future expectations of increase in production in Finland are neutral, while there is an expectation of decline in production outside the EU. (Kaitilia et al., 2025)

Firms using cement products will face increased costs due to the tightening climate policy and CBAM tariffs, which will be passed on to the end-users. This may lead to higher prices for construction projects and infrastructure development, the size of the increase depending on the ability of the sector to adapt to the low-emission production.

Sweden

Sweden produces approximately 2.8 Mt of cement annually (0.05 percent of global production) in two factories, in Gotland and Skövde, both owned by Heidelberg Materials Cement. These facilities emit 1.9 Mt of CO2, which is approximately 4 percent of Sweden's GHG emissions. Heidelberg cement has communicated plans to build the world's first climate neutral cement facility by capturing and storing 1.8 Mt CO2 per (Svenskt Näringsliv, n.d). Sweden is almost self-sufficient on cement, with approximately 15 percent of Sweden's need being imported.

According to Tillväxtanalys (2020), it would be very challenging for Sweden to import its total need for cement although it would be possible to import some from neighbouring countries around the Baltic Sea.

Since reliance on imports is relatively low, CBAM is unlikely to significantly alter Sweden's cement trade patterns. Instead, the mechanism may primarily influence the sector by strengthening incentives to invest in low-carbon production methods. Ongoing initiatives focused on carbon capture and storage suggest that Swedish cement producers are already preparing for a tightening regulatory environment in the coming years.

5.5.5 Concluding remarks

Across all sectors, CBAM generates both cost pressures and strategic opportunities. The Nordic countries are comparatively well positioned in some CBAM-covered sectors due to lower average emission intensity, although this advantage varies by sector and is not driven by systematically cleaner import patterns. However, their structural disadvantages — including high wage, and high land prices — mean that CBAM alone will not ensure long-term competitiveness in the context of the green transition. To maintain their lead, Nordic producers could scale up low-carbon technologies, and building resilient value chains that reduce exposure to volatile imports. The Nordic experience may therefore serve as a test case for how climate policy can drive competitiveness in high-cost regions, provided that policy stability and targeted sectoral support are maintained over time.

5.6 Case studies or simulations estimating CBAMs influence on trade behaviour

To better understand how CBAM may affect trade, production and competitiveness, economic modelling exercises have been conducted at both EU and national levels. These include general equilibrium models, input–output analyses and sector-specific simulations. While the methods and assumptions differ, they collectively provide early insights into how CBAM may alter market flows. The following subsections summarise key findings from the literature, with a particular focus on the Nordic context and the implications for upstream and downstream industries.

5.6.1 Insights from Finnish general equilibrium modelling studies

Macroeconomic modelling offers detailed information on the impact of CBAM, namely on trade flows, output and welfare. Here we refer to recent GTAP modelling exercises (See, e.g. Kuusi et al., 2020; Kaitila et al., 2022). The GTAP model is static and describes only the long-run equilibrium allocative impacts of the CBAM. Short-term adjustment costs and transitional dynamics are not captured, and the technological long-term adjustments in the model are limited.

Imports from non-EU countries with high embedded carbon, such as those in heavy manufacturing, face the greatest decline. For Nordic countries like Finland, this means a shift in sourcing towards EU partners and an uptick in domestic substitution, especially in sectors covered by CBAM. Exports of CBAM-affected products to the EU rise, but exports to non-EU countries tend to fall due to both substitution and reduced demand.

The mechanism also reallocates production. Sectors covered by CBAM—iron and steel, non-metallic minerals, and others—see increased output as they gain competitiveness relative to imports. This effect is amplified in countries where these sectors are significant. Conversely, industries that rely heavily on imported inputs from non-EU countries or export a large share of their products outside the EU may see output decline, particularly if their products are subject to higher tariffs or if global demand softens.

CBAM influences welfare primarily through terms-of-trade effects. As export prices rise and import prices fall for the EU, welfare tends to increase for EU countries, including the Nordics. For non-EU countries subjected to CBAM, welfare declines as their export competitiveness erodes. The redistribution of resources across sectors may create efficiency losses, but these are often outweighed by the gains from improved terms of trade, especially under moderate CBAM implementation.

5.6.2 Key differences in different implementations

In a feasible scenario with current implementation, CBAM is narrowly applied to a select group of sectors and considers only a limited range of emissions. This leads to modest adjustments: the drop in non-EU imports is concentrated in a handful of carbon-intensive goods, and the production boost for protected industries is relatively contained. Welfare gains in the EU are positive but limited, and most non-EU countries experience minor welfare losses. The substitution between non-EU and EU/domestic sources is significant mainly in targeted sectors.

Across the EU, the shift from Scope 1 to Scope 3 intensifies the negative GDP impact (Kaitila et al., 2022). Especially when paired with higher carbon prices, all EU member states face GDP declines. The efficiency losses rise as CBAM broadens, even as welfare gains become more pronounced in low-carbon sectors.

Sectors within the EU and Nordics that produce CBAM-covered goods (such as steel and aluminium) tend to benefit most from CBAM, experiencing increased output and competitiveness as imports of more carbon-intensive products become relatively more expensive. In contrast, downstream sectors that are dependent on imported inputs or are strongly export-oriented (like electronics and machinery) are more adversely affected, echoing previously risks for companies heavily reliant on international supply chains.

A broader application of CBAM, including a wider coverage of emissions and product categories, can prompt substantial reductions in high-emission imports from countries such as China, India, and Russia. This delivers stronger environmental improvements but also triggers greater economic distortions in both EU and non-EU countries. The breadth of CBAM's application is therefore decisive for both trade redirection and the environmental integrity of the mechanism.

Efficient scenario in Kuusi et al. (2020) encompasses a wide array of industries and takes into account all emissions associated with production. The resulting carbon tariffs are higher and more widespread, leading to deeper reductions in non-EU imports, especially from high-carbon regions such as Eastern Europe and China. Protected sectors—like iron and steel—see substantial output increases, while sectors reliant on exports outside the EU or imported inputs (e.g., electronics, machinery) may experience output declines.

Welfare gains in the EU are more pronounced, but so are efficiency losses from the greater resource reallocation. Non-EU countries, particularly those with high-carbon economies, face sharper declines in both welfare and production.

5.6.3 Trade patterns: primary products and secondary products

It's useful to distinguish between the impacts of CBAM on EU primary products, such as steel, aluminium and cement, and secondary products, such as vehicles and buildings.

Primary products

According to Konjunkturinstitutet (Dahlqvist et al., 2025) a CBAM makes imported materials more costly resulting in a reduction of imported materials and increase in EU produced materials, thus improving the competitiveness of EU material producers. This will lead to increased emissions in the EU but could lead to reduced emissions globally if EU material producers have lower emissions per product. The impacts of CBAM on primary products is described graphically in the figure below.

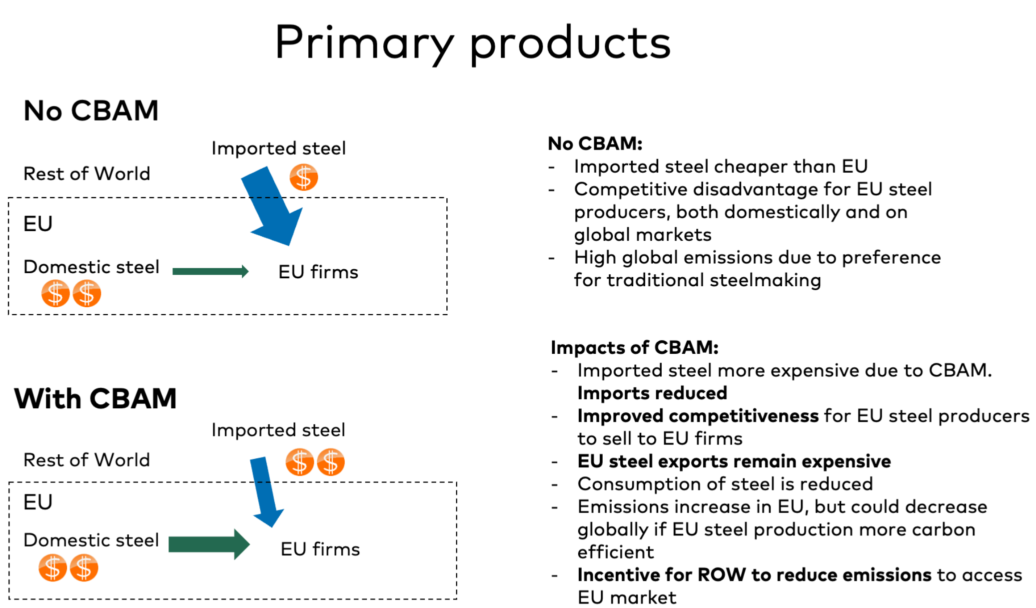


Figure 7. Illustration of the impacts of CBAM on primary products

Secondary products

Secondary products are products that use materials covered by CBAM and could for instance be vehicles and buildings. With a CBAM, imported materials become more expensive and this cost increase propagates downstream either reducing the profits of those using materials or making the end products (for instance vehicles) more expensive. Konjunkturinstitutet (2025) finds that when these costs are forwarded to firms, this can lead to reduced competitiveness both on the EU market and on export markets. According to a recently published OECD report (Dechezleprêtre et al. 2025), a CBAM would have an impact on exports from EU producers. The impact on secondary products is described graphically in the figure below.

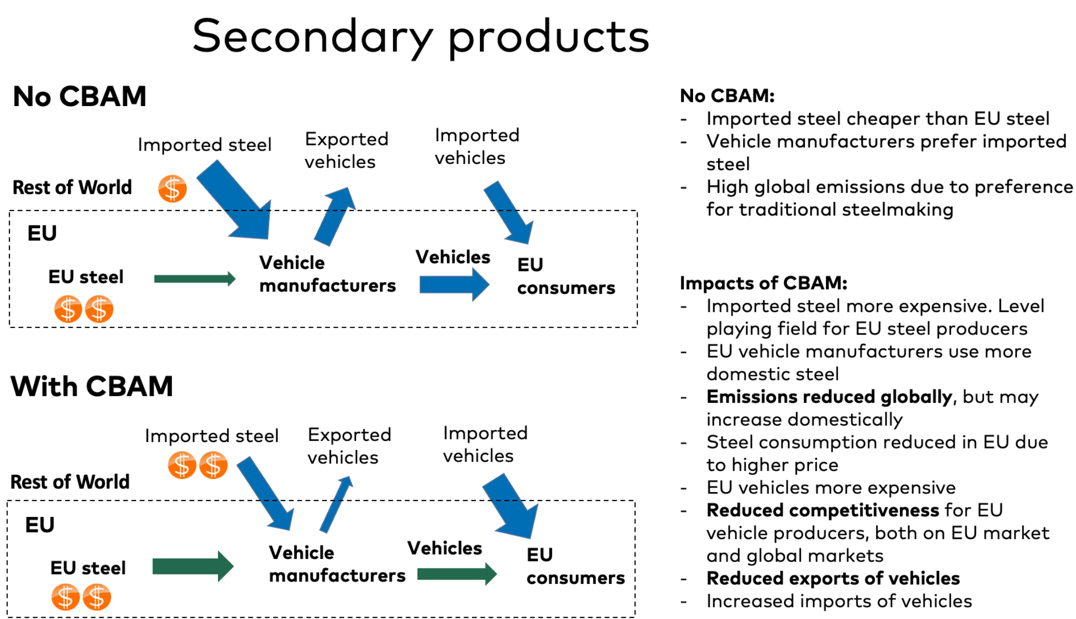


Figure 8. Illustration of the impacts of CBAM on secondary products.

Dechezleprêtre et al. (2025) also finds that a CBAM could lead to lower global emissions due to EU imports being redirected to countries with lower emissions. Böhringer et al (2016) find that EU carbon tariffs can provide incentives for countries to strengthen their climate policy to gain access to the EU market.

5.6.4 Internal production and competitiveness on the intra-EU market – findings from MRIO modelled scenarios (Amendola, 2025).

In a study analysis conducted by Amendola (2025), a MRIO based framework was developed to simulate estimations of new production levels in each country and covered industry, following the immediate effect on increased production costs following CBAM. The model is based on 163 industries and 49 regions, divided into non-adopting and adopting countries, where all EU member states are included, as well as Norway and Switzerland (considered as adopting countries of the CBAM due to the design of the policy) and 20 non-adopting countries.

Results suggest, that the CBAM has modest macroeconomic effect on inflationary impacts, such as increased production costs, in both adopting and non-adopting countries and that this effect can be mostly attributed to the elimination of free allowances rather than to the effect of the CBAM and are more pronounced within adopting countries within the EU. The result of the study shows a modest decrease in GDP in adopting countries (and a negligible effect on non-adopting countries), mostly due to the decrease of internal production and losses on export. However, the results show a degree of heterogeneity in terms of macroeconomic repercussions, showing that especially Eastern European countries are at higher risk of losing a share of GDP larger than the EU average loss from the implementation of the CBAM. On the contrary, the economies of Denmark and Finland are highlighted as countries showing no adverse effects to their inflationary pressures. For all the modelled scenarios, the scope countries show only minor differences in total-, internal- and foreign competitiveness, deeming it almost negligible. However, the results highlight intra-EU distributional issues of the policy.

On the contrary, on a sectoral scale, the results show that for adopting countries, almost all the affected downstream sectors experience a decline in production, and an increase in production prices, mostly significant for the cement industry with an increase of up to 14% (production prices of turning ash into clinker), suggesting much larger impacts on the sectoral level than on macroeconomic scale. Non-adopting countries is found to experience a gain in production in these downstream industries (most profoundly in the cement industry), indicating risks for carbon leakage to non-adopting countries. However, disaggregating these results again shows large intra-EU differences. Interestingly, the three scope countries all experience a gain in total competitiveness on a sectoral scale, with industry variations.

In an OECD report (Dechezleprêtre et al., 2025) estimating the potential effects of the CBAM across the value chain in both EU and Non-EU countries also utilizing input-output models in their study, similar results are evident showing the same trends as in Amendola (2025).However, this report states lower price changes across sectors estimating a range 0f 0–0.6%. The report points out, that even though there are sectoral differences, and some downstream sectors are in risk of carbon leakage, the overall contribution of the CBAM policy mitigates carbon leakage by -12.40% in all covered industries.

6. Impact on consumption based emissions

The Nordic countries are often high performers when it comes to mitigation of national (terrestrial) emissions and working towards sustainability, positioning on top rankings on indicators such as The Climate Change Performance Index (CCPI, n.d) and the SDG performance index (Sustainable Development Report, n.d). However, the Nordic countries often face challenges in reducing climate impact when it comes to consumption-based emissions (Nordic Council of Ministers, 2025). Climate policy and goals are often based on terrestrial emissions, leaving out the accountability of emissions for consumption of foreign goods.

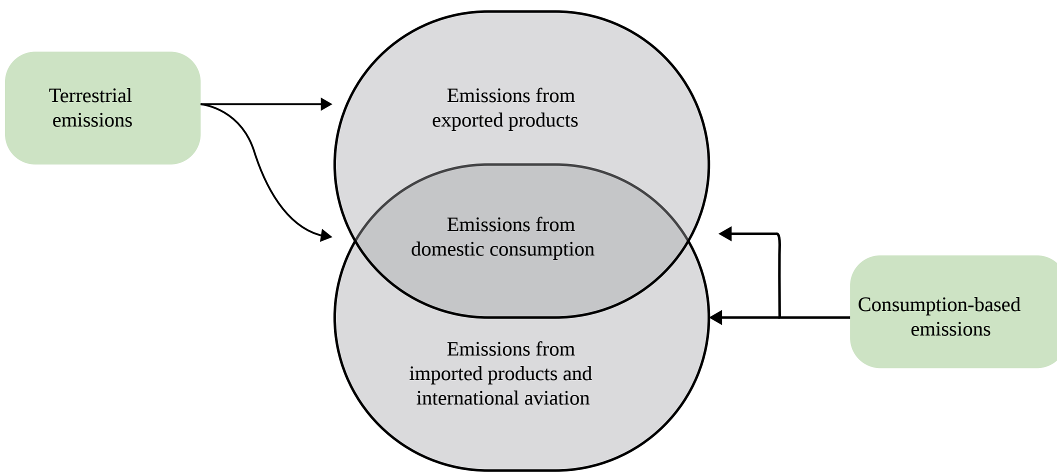


Figure 9. Relationship between terrestrial and consumption-based emissions

Historically, and still in many parts of the world, national territorial GHG emissions have been closely correlated to GDP. Yet, between 2010–2018, the EU saw a decrease in domestic environmental impact, while still experiencing economic growth, indicating a decoupling of environmental impact from economic growth (European Commission, 2022a). However, when emissions related to trade are included, the decoupling proved to be limited. Consumption-based emissions are typically higher than territorial emissions in wealthy countries, posing a responsibility for the Nordic countries to rightfully account for consumption-based emissions while still thriving for continuously increasing wealth (Nordic Council of Ministers, 2024; Our World in Data, 2024). Consumption-based accounting allows for national emissions to include trade-based emissions, reflecting actual emissions related to national consumption. This emphasizes the importance of trade-focused policies, like CBAM, in the aim of mitigating national emissions in the Nordics.

6.1 Current methodologies for calculating consumption-based emissions

This section outlines the main methodological approaches used to calculate consumption-based emissions, and describes how Finland, Sweden and Denmark currently apply these methods in practice. The section focuses on consumption-based accounting (CBA), and the top-down and bottom-up approaches with multi regional Input-output tables (MRIO) and Life Cycle Assessment (LCA). It also highlights the growing relevance of these methodologies in light of CBAM, which may provide new data sources that can strengthen existing models.

6.1.1 Consumption-based accounting

Consumption-based accounting (CBA) is a method to calculate national GHG-emissions caused by the consumption of its residents, regardless of where in the world these emissions occur (see figure x). Contrary to terrestrial/production-based accounting, it captures the emissions in the entire life cycle of satisfying final consumption (Tukker et al., 2020). Consumption-based emissions differ from terrestrial emissions, as it goes beyond geographical borders, and add the dimension of trade. As a substantial part of the consumption in the EU is imported, a large share of the emissions associated with that consumption is generated in third countries. The countries covered within the scope of this study have among the highest consumption-based footprint in the EU, all ranking above EU-27 average. According to a recent report by (Axelsson et al., 2024) , Denmark had the highest per capita consumption based climate footprint in the EU as of 2021, emphasizing the importance of consumption-based emissions.

To ensure accurate consumption-based accounting, it is vital to have sufficient data which requires data collection not only nationally but from supplying third countries. This has resulted in several databases, utilized by countries in national consumption-based accounting. Among these are ICIO (OECD database), EXIOBase, FIGARO (EU), GTAP, WIOD-database and the EORA-database (Nordic Council of Ministers, 2024). These are usually divided into individual country tables, making them accessible for specific country analysis. The databases have different qualities, dependent on the desired calculation approach and choice of modelling in consumption-based accounting (Nordic Council of Ministers, 2024).

6.1.2 Top-down and bottom-up approaches

The bottom-up approach refers to the life cycle assessment (LCA) accounting approach, where the entire GHG inventory of a product, service, process or policy is tracked all through the value chain (Wiebe et al., 2016). The LCA approach has a primary focus on systematic analysis of the product, and is a micro-scale tool, making it useful in providing individual consumption levels. The LCA method is thoroughly standardized, notably in the international standardization, ISO (International Organization for Standardization) 14040 series (ISO, 2006), making it possible to harmonize the application. As the approach is product based, it is not an efficient method in addressing macro-scale consumer impact (Wood et al., 2018). Working with the LCA approach on a governmental scale is difficult, as it heavily relies on the data collection skills of producers, making it a labour-intensive procedure. It is therefore not a commonly used method to calculate consumption-based emissions on a national scale. However, the LCA approach has laid the foundation for governmental scale frameworks, such as the European Union framework on addressing the performance on consumption-based emissions of member states (European Commission, 2022a). Due to the data-intensive dimension of the bottom-up approach, a top-down approach that is based on economic flows between sectors and has readily available data, offers a popular alternative.

Central to the top-down approach is typically an input–output table describing the goods and services bought and sold between different actors in the economy and finally sold to final consumers (Palm et al., 2019). The multi-regional input-output (MRIO) model is the main method in the top-down approach and is a very common tool in consumption-based accounting. For environmental data, the model can be extended with "Environmental Extensions" (EE), describing the resource use or emissions per industry, in which case the model is called an EE MRIO model. This is the most commonly used method to calculate embodied carbon emissions in consumption-based accounting in the Nordic countries (Nordic Council of Ministers, 2024). The EE MRIO model allows for an analysis of regionally embodied carbon emissions in product consumption that includes trade dimensions, and value added along the production chain (Wiebe et al., 2016). EE MRIO is based on (country specific) input-output tables of different sectors and industries as well as several product and service groups, creating supply-use matrices that shows how much input a sector need, to produce an output product (Tukker et al., 2020). The EE can include a variety of environmental stressors including GHG emissions but also e.g. electricity usage, water extraction, and land use (Wood et al., 2018). While EE MRIO models are typically seen as valuable tool for providing overviews of key resource flows and associated environmental impacts limitations like course sector detail, time lags and uncertainty in trade flows and emission factors means that existing models are typically not well adapted for analysis of systems in transition and for fine-grained, short-term policy design.

The literature suggests that consumption-based accounting can provide more accurate calculations of environmental impact with a hybrid model, coupling both top-down and bottom-up approaches with extended data (See: Osei-Owusu et al., 2022; Tukker et al., 2020; Wiebe et al., 2016). A hybrid model can help minimize some of the limitations of both the bottom-up and top-down approaches, potentially minimizing errors of completeness and accuracy (Wiebe et al., 2016). With the EE MRIO method, it might prove difficult to account the new data that CBAM offers, as they are product specific. However, CBAM can provide data to potentially make a hybrid model between the two approaches, offering a supplement to the existing methodology (see Section 4.3). Both Denmark, Sweden and Finland use hybrid models that combines domestic emissions data with emissions data from EXIOBase.

6.1.3 Methodologies in scope countries

Denmark, Finland and Sweden all apply variations of hybrid models to calculate consumption-based emissions, combining domestic emissions data with internationally sourced input–output databases such as EXIOBase. While the underlying methodology is broadly similar across the three countries, the implementation, level of regional detail and policy relevance differ. The following subsections briefly outline the current approaches in each country and highlight emerging challenges and opportunities for further development—particularly in relation to data quality, model comparability and potential links to CBAM.

Denmark

The Danish consumption-based emissions are calculated and published yearly in a report by "Energistyrelsen" (the Danish Energy Agency), that maps out Denmark's global climate impact. The method of calculation is the top-down approach of Input-output tables and emission accounts with domestic data from Statistics Denmark and foreign (import) data from EXIOBase (Energistyrelsen, 2025b). The Danish model is thus a coupled model, that combines global and domestic data as described in (Tukker et al., 2018a).

According to the 2025 report, Danish emissions consist of 40% domestic emissions and 60% foreign emissions, mostly within Europe (46%) and Asia (China 16% rest of Oceania and Asia 13%) (Energistyrelsen, 2025a). The report also states that the data, especially from importing countries have a degree of uncertainty as there is no standardized method of collecting data, stating that the agency will keep updating their methods as the discipline of consumption-based accounting progress. In 2023, the Danish think-tank CONCITO made a report on the Danish consumption-based emissions (Minter et al., 2023). Their results showed higher per capita consumption-based emissions (13 tonnes CO_2 per capita) than the 2023 report from the Danish Energy Agency in 2023 (11 tonnes CO_2 per capita). This is mainly due to differences in data handling between the two reports. The Danish Energy Agency has an attributive approach, that base results on historical data, whereas CONCITO use marginal data to predict future consumption patterns (Energistyrelsen, 2025b; Minter et al., 2023).The report from CONCITO also show, that several calculations of the Danish consumption-based emissions differ, emphasizing the need of a standardized system.

Finland

The Finnish environmental institute (SYKE) is the responsible body for calculating consumption-based emissions in Finland. The model used is a hybrid EE-MRIO model called ENVIMAT, that consists of domestic data from 148 industries and 229 product groups as well as data from various data sources, including EXIOBase (Finnish Environment Institute, 2025). According to SYKE, the model is applicable to a variety of accounting data, including self-constructed accounts. This has been utilized in the six-year project (2018-2024) "Towards Carbon Neutral Municipalities and Regions" (Canemure), that has created a calculating scenario tool (AlasSken) for municipalities and regions to calculate consumption-based emissions, making the tool available in practice (Hiilineutraali Suomi, 2025). In 2023, the consumption-based emissions of Finnish municipalities were published for the first time, setting the scene for local-level monitoring of consumption-based emissions (Finnish Environment Institute, 2024).

Sweden

The Swedish consumption-based emissions are calculated yearly by Statistics Sweden (SCB), and are based on domestic data as well as data from EXIOBase (Naturvårdsverket, 2025a). Sweden faces the same concerns related to the uncertainty of third country data, as the Danish government. In 2018, the framework PRINCE (Policy-relevant Indicators for National Consumption and Environment) for modelling consumption-based emissions in Sweden, was implemented, ensuring that the methodology to monitor the impact of consumption, both within- and outside Sweden's borders, were up to date (Brown et al., 2022). The model in PRINCE is a hybrid EE-MRIO model, linking Swedish domestic consumption-data with global emissions data from EXIOBase.

Sweden has integrated consumption-based emissions into its national environmental framework through the Generational Goal. The long-term ambition is to reduce consumption-based emissions to 1 tonne CO_2 per capita by 2050. In 2022, "Miljömålsberedningen" (a cross-party parliamentary committee on environmental goals) proposed extending the national territorial emission reduction targets to formally include consumption-based emissions, arguing that focusing solely on territorial emissions will not be sufficient to achieve climate neutrality (Miljömålsberedningen, 2022). To support this discussion, the Swedish government also commissioned a technical background report outlining alternative scenarios for future climate targets (Larsson et al., 2021; Morfeldt et al., 2023).

Still, to date, no political agreement has been reached on adopting a binding target for reducing greenhouse gas emissions on a consumption basis.

Concluding remarks

In conclusion, all of the three scope countries use the same baseline methodology, with same global input-output tables (EXIOBase), but with calculation differences (Nordic Council of Ministers, 2024).

As all the countries use hybrid models to extend and precise their data, the integration of data from CBAM shows great potential in optimizing the country models, resulting in more detailed sectoral data on embedded emissions for the most relevant industries in terms of emissions mitigation potential. Collaboration on utilizing emissions data from the CBAM industries in the calculation-models pose a potential benefit for the Nordics to extend their respective methodologies.

6.2 How could CBAM contribute to improving consumption-based accounting systems

While consumption-based accounting (CBA) provides a more comprehensive view of national climate footprints, current models face limitations related to data quality, granularity, and timeliness. CBAM introduces a new regulatory framework that requires detailed, product-level reporting of embedded emissions upon import. This has the potential to address several long-standing challenges within CBA systems. The following subsections explore how CBAM data could improve accuracy, harmonisation, and temporal relevance in existing Nordic CBA methodologies—and what technical and institutional adjustments may be needed to realise this potential.

6.2.1 Better data on embedded emissions

As the underlying assumptions of the data differs throughout databases, the results are not consistent (Wiebe et al., 2016). Additionally, different modelling approaches uses varied data input (as is the case for all three scope countries). For this reason, results can differ depending on what database is used. In a report by the Nordic Council of Ministers (2024), Swedish results of a comparison of consumption-based emissions showed different outcomes using the EU founded database FIGARO and EXIOBASE. They differed with 8.5%, with FIGARO showing the highest emission levels. Axelssons et al. (2024) compare two calculations based on different databases. One shows that in the Nordics, Norway and Finland has the highest consumption-based emissions, while the other says Denmark. These differences are most likely attributed to the level of granularity in sector and product groups. However, top-down approaches such as EE-MRIO models has a practical limit to their granularity, and total disaggregation of products is practically unfeasible (Tukker et al., 2018b). All three scope countries use EXIOBase, that has 200 product groups offering a relatively high amount of granularity compared to other input-output tables.

EE Input-output models are in most cases based on the assumption of sector-specific homogeneity in case of emissions-intensity, which is a limitation in computing precise emissions data through-out the sectors. That means, that there is a fixed relationship between monetary values and emissions within each sector in the Input-output models, often not allowing for differences in emissions intensity in production. For example, the Iron and steel industry have different production processes, that varies greatly in emissions intensity. These differences are not necessarily captured with generic data, as these represent world average data for product groups and sectors. For CBAM to contribute to improving consumption-based accounting systems, emissions data need to be country- (or region) specific instead of generic average world data. In this way, differences in country specific production would be captured in the models. Allowing these differences in the input-output tables would be able to capture the effect of CBAM in terms of shifts towards less emissions intensive products. EE-MRIO models are well-suited for capturing broad international trade flows and economy-wide emissions, but their aggregation makes them less suitable for analysing sectoral transition pathways or technological shifts. As a result, they are less equipped to evaluate rapid changes in production patterns—such as those expected under CBAM—highlighting the value of integrating more granular emissions data into future CBA models.

CBAM will require importers to report product-specific embedded emissions (verified at installation level, with fallbacks only if data are missing). Over time, this will generate a new, high-quality dataset on the carbon intensity of imports into the EU. If made accessible, these data can replace generic emission factors in Nordic CBA systems, improving accuracy. Furthermore, since CBAM is linked to customs data, this could open for closer alignment between trade flows and emissions. This can help national statistical agencies integrate product-level embodied emissions into consumption accounts.

6.2.2 Harmonization of datasets

If all EU importers report embedded emissions according to a unified CBAM methodology, the resulting dataset could significantly improve the consistency and comparability of consumption-based emission accounts across member states. This harmonisation would help address one of the key challenges in current CBA models: methodological divergence and varying data quality across countries and data sources.

For Finland, Sweden and Denmark — where relatively advanced systems such as PRINCE (Sweden) and ENVIMAT (Finland) are already in place — CBAM data could support more robust cross-country benchmarking and alignment of input parameters. Over time, this could enable more coherent regional assessments of carbon footprints, facilitate shared methodological standards, and strengthen the basis for coordinated policy measures. However, using CBAM data for harmonisation would require agreement on data formats, system boundaries and allocation rules to ensure compatibility with existing national models.

6.2.3 Dynamic updating

Because CBAM requires ongoing reporting—quarterly during the transitional phase and annually once certificates are paid—it will generate a continuous flow of updated embedded emissions data. This regular reporting cycle presents an opportunity to address one of the most significant limitations of current CBA methodologies: the time lag of 3–5 years typically associated with MRIO-based footprints. More frequent updates could make consumption-based accounting more policy-relevant, enabling timelier tracking of the effects of trade policies, technological shifts and supply chain adjustments.

If integrated effectively, CBAM data could support a gradual move towards more dynamic CBA systems, with better alignment between trade flows, emissions data and policy instruments. Real-time or near-term data would also allow governments to detect emissions shifts earlier, assess the impacts of policy interventions, and strengthen the feedback loop between climate targets and industrial responses. However, realising this potential would require system integration and clear protocols for data access, validation and compatibility with existing models.

6.2.4 Allocation of emissions responsibility

Consumption-based accounting assumes full responsibility to the final consumer, and in theory leaves out producer-based responsibility (Zhang et al., 2023). Although consumers drive the production of goods, consumers are also enabled by different drivers and factors such as advertising, availability of cheap goods, social influence and planned obsolescence (Sustainability Directory, 2024). There have been several proposals of approaches to sharing of responsibility of emissions through-out the value-chain, ensuring the dimension of both upstream producers and downstream consumers. Among many others, these include average of consumption-based and income-based emissions, a 'technologically corrected' consumption-based approach that rewards exporters with lower-than-average embodied emissions, the value added approach, and lastly the border tariff adjustment, such as CBAM (Tukker et al., 2020; Zhang et al., 2023). However, border tariff adjustments does not address emissions responsibility between producers and consumers domestically, but adds an element of responsibility allocation in cross-border trade, that aids in altering producer and consumer behaviour (Zhang et al., 2023).

6.2.5 Integration of CBAM and Consumption-Based Accounting (CBA)

While CBAM represents a major step forward in aligning trade policy with climate objectives, its impact on national consumption-based emissions (CBA) is expected to remain relatively modest in the short term. This is primarily because CBAM currently covers only a limited number of sectors, whereas CBA encompasses the entire consumption basket. As a result, the measurable reduction in national CBA figures will be small unless CBAM expands to include a broader range of products over time.

CBAM may, however, provide an important improvement in data availability and data quality for selected product categories. Yet existing CBA models are not fully equipped to analyse systems undergoing rapid transition, which limits their current usefulness for integrating CBAM data. Efforts to strengthen the analytical link between CBAM and CBA require methodological adaptation and the ability to capture dynamic shifts in supply chains, technology choices, and embedded emissions.

Linking CBAM shipment-level emissions data with national CBA frameworks would, in principle, enable more accurate assessments of the climate impact of imported goods. However, this would demand considerable harmonisation and alignment across data systems and methodologies. Such an undertaking is likely to be resource-intensive and should therefore be approached with care, weighing the potential improvement in CBA accuracy against the administrative and technical costs.

6.3 The impact of CBAM on consumption-based emissions in the Nordics

As also discussed above, CBAM can influence Nordic consumption-based emissions through several interacting channels. By raising the price of covered imports, it encourages substitution toward lower-carbon foreign suppliers, EU/EEA producers, or alternative materials, reducing embodied emissions in consumption. At the same time, exporters facing the EU border price may decarbonise their production to remain competitive, further lowering the footprint of Nordic imports. Some re-shoring of inputs to the EU could also reduce imported emissions if EU production is cleaner than that of displaced sources. The impact would grow if CBAM expands to include indirect emissions and downstream products, exposing a larger share of the consumption basket. Finally, higher prices may suppress demand for carbon intensive goods, particularly in construction and durable sectors. The latter may have distributional effects that are worth paying attention to. For Finland, Sweden and Denmark, CBAM will likely drive down consumption based emissions, but the added costs may be unevenly distributed, with vulnerable consumers and sectors bearing higher costs (Amendola, 2025). Overall, these mechanisms suggest that the introduction of CBAM will contribute to reducing Nordic consumption-based emissions in the short to medium term, though the scale depends on price pass-through, supplier responses, and the breadth of CBAM's scope.

As consumption-based emissions are dependent on the intermediate or final consumption of goods, CBAM will likely aid in increasing demand for low-carbon technology both domestically and internationally, or simply just reduce overall consumption (Tukker et al., 2020). CBAM will thus be affecting both territorial emissions and consumption-based emissions, potentially showing a decline in consumption-based emissions in the Nordics.

Input-output models are advantageous in assessing the effect of an intervention to consumption-patterns (Wood et al., 2018). The framework of EE MRIO models is likely to be effective in capturing the effects of CBAM on the shift in consumption, positioning the Nordics well to evaluate impacts on consumption-based emissions. However, given the limited sectoral scope of CBAM, the effects on aggregate national consumption-based emissions are likely to be moderate, with more pronounced impacts at the level of specific products and sectors.

7. CBAM system expansion

The discussion around the scope of CBAM centres on two main approaches: narrow, feasible implementation and a broader, more efficient one. (Kuusi et al.. 2020) One of the principal strengths of the narrow design is its administrative practicality: by targeting a limited number of sectors, the EU has aimed to streamline data collection, regulatory enforcement, and compliance, reducing the complexity for customs officials, regulators, and businesses. Legally and politically, the focused nature of the mechanism helps demonstrate fairness in international trade, lowering the risks of World Trade Organization disputes and minimizing potential trade retaliation. Economically and environmentally, the impact of the EU CBAM remains contained, as it affects only a fraction of total imports.

However, a narrow CBAM has its drawbacks. Its limited coverage means it cannot fully resolve the problem of carbon leakage, and there remains the risk that emissions could shift into products not covered by the mechanism. This loophole could undermine the effectiveness of the EU's climate policy.

In contrast, a broader CBAM would encompass a much wider range of emission-intensive products, potentially covering up to all manufacturing sectors. It would involve more detailed and country-specific emissions data and might include all direct and indirect emissions. The broader scope would allow the mechanism to address carbon leakage much more effectively, as more imported emissions would be covered and there would be fewer opportunities for emissions to shift into unregulated products. This would send a strong price signal to foreign producers, encouraging decarbonization across more sectors, and would help ensure a level playing field between EU and non-EU producers. In the long run, a broader CBAM would align with more ambitious climate targets and could prepare the ground for broader international cooperation on carbon pricing. The broader approach, however, brings significant challenges. The complexity and administrative burden increase sharply, as collecting, verifying, and monitoring emissions data across many sectors and countries is difficult and costly.

The risk of legal challenges also rises, since a broad CBAM is more likely to be viewed as arbitrary or discriminatory under international trade rules. Political risks are higher, too, as the chances of retaliation from trading partners—especially large economies like China—increase. There are also potential negative effects on EU industries that rely on global value chains, as more expensive imported inputs could make these industries less competitive internationally.

The current situation is that the CBAM system is set to expand its scope to include either more downstream products, more emissions per product category, or new product categories also covered by the ETS. Expansion of the CBAM system will increase the current costs for importers and can potentially include more importers in the system.

Many questions about the expansion have not yet been clarified by the EU. According to article 30 of the CBAM regulation, a report on potential expansion of the regulation should be published by the end of the transitional period (late 2025), but had not been so by the finalisation of this report.

This section will investigate the potential impacts of different types of expansion. Listed in article 30, are four possible avenues of expansion for the CBAM scope:

1. Embedded indirect emissions in the goods listed in annex II
2. Embedded emissions in the transport of the goods listed in annex I
3. Goods at risk of carbon leakage other than those listed in annex I, and specifically organic chemicals and polymers
4. Other input materials (precursors) for the goods listed in annex I.

Further, in recital (38) and (65) the future expansion to cover downstream products is mentioned, to avoid carbon leakage.

Expansions 2 and 4 extend past the scope of the report, and as such the following section will focus on extending CBAM to cover indirect emissions, and which sectors CBAM potentially could expand into.

7.1 Impact of CBAM expansion on Nordic competitiveness

Previous sections have described the current state of the CBAM regulation, and the opportunities and risks it presents for Nordic industry. This section builds on the previous conclusions, by investigating what would happen if the scope of CBAM was expanded to include indirect emissions.

7.1.1 National elasticity to increased costs

Expanding CBAM to require importers to purchase CBAM certificates for both direct and indirect emissions for all covered sectors will increase the economic burden on importers and will improve conditions for the protected sectors. In the following, the increased expected cost is modelled.

Evaluating the increased costs from both direct and indirect emissions can be done using emission data from the EEMRIO database EXIOBase. The datasets in EXIOBase allow a division of CO_2-emissions into categories. It is possible to distinguish how much CO_2e is emitted from direct sources (e.g. coke or coal), indirect sources (e.g. electricity), and other sources (precursor products, transport, waste treatment, etc). CO_2-emissions from indirect and other sources might possibly be tariffed with an expansion of CBAM. Using an average ETS-rate it is possible to calculate the annual increased cost for importers, for all four sectors, nationalized to exporting countries (Figure 4)

The emission factors (EF) are calculated as a weighted average between the largest countries by imported mass, covering minimum 80% of imports. The EFs are calculated per sector per country, weighted by the imported amount from each country.

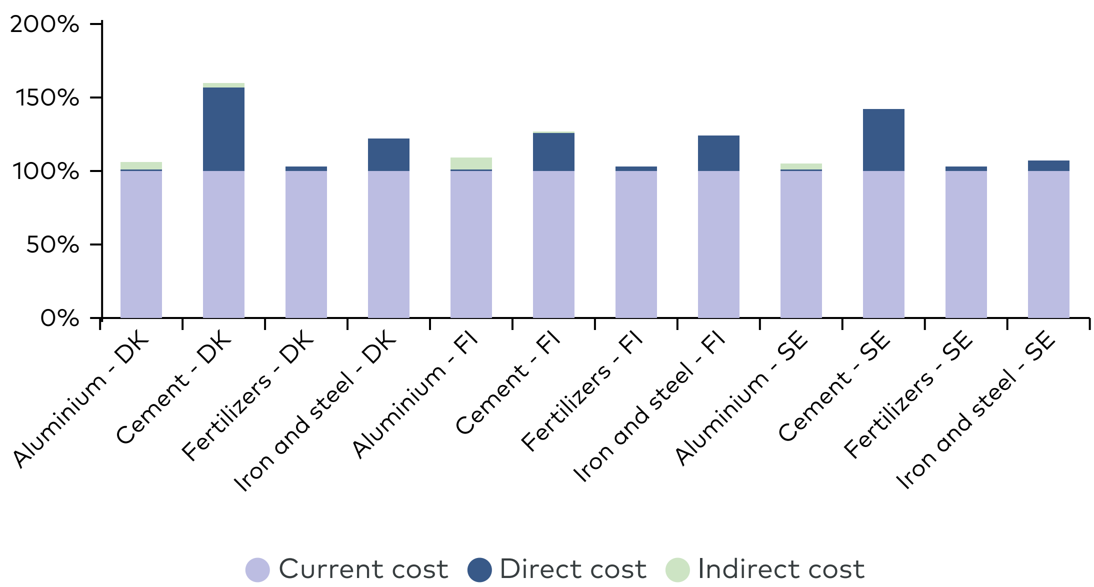


Figure 10. Calculation of total cost increase in % for both direct and indirect emissions, compared to average existing cost. An average ETS price of 72.8€/T CO2e is used.

Based on the percentual price increases, as well as a list of European tariff elasticities (Kuusi et al, 2020) it is possible to calculate the predicted percentual change in imports. No tariff elasticity is available for fertilizers, so this sector has been excluded.

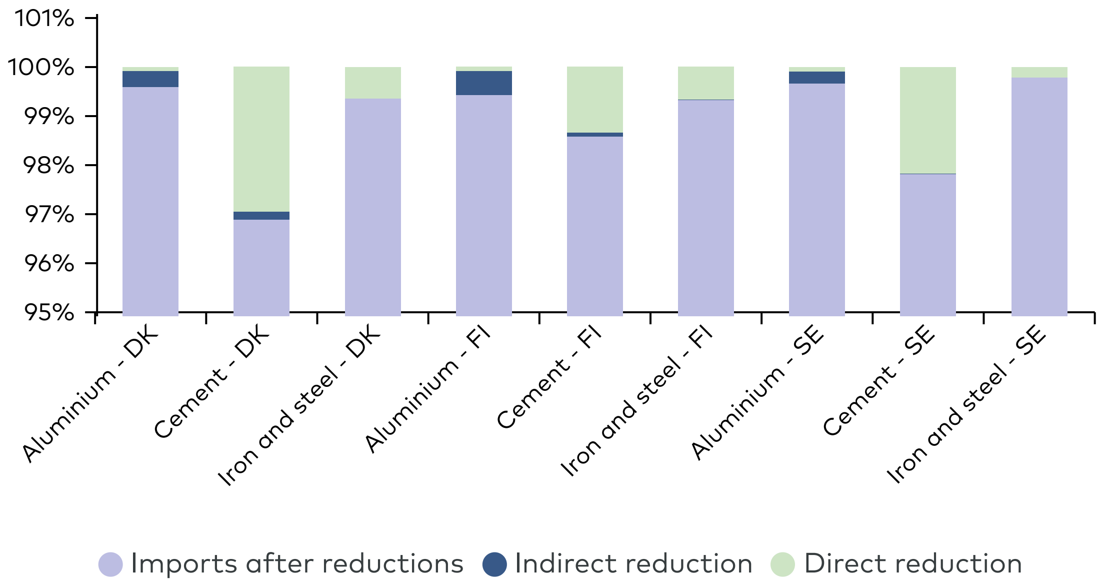


Figure 11. Predicted decrease in import due to increased CBAM costs from direct and indirect emissions

Note: The graph's y-axis starts at 95% and stops at 101% to enable a better visualisation.

The predicted decrease in imports, corresponds to an economic value that is displaced from the current exporting countries to either EU or non-EU producers, or results from reduced demand due to higher prices. The estimated annual economic values of displaced imports are seen in Table 2. and vary significantly across sectors. In particular, sectors such as iron and steel and aluminium account for a substantial share of the displaced value, reflecting both their trade exposure and sensitivity to carbon-related cost increases. In contrast, sectors with lower import volumes or more limited CBAM coverage show smaller absolute impacts.

These sectoral differences suggest that the observed effects reflect a combination of trade diversion and demand reduction, with the relative importance depending on product characteristics and market structure. As discussed previously, Nordic suppliers may have a potential competitive advantage in some CBAM-covered sectors where domestic production has lower emission intensity, although the extent to which displaced imports are replaced by Nordic production rather than by other EU or non-EU suppliers remains uncertain.

Country	Product	Value displaced from direct costs (€)	Value displaced from indirect costs (€)	Sum of displaced value (€)
DK	Aluminium	323,866	1,290,118	1,613,984
DK	Cement	430,446	23,706	454,152
DK	Iron and steel	6,375,868	33,439	6,409,306
FI	Aluminium	197,610	1,176,905	1,374,515
FI	Cement	9,302	512	9,814
FI	Iron and steel	3,563,105	17,735	3,580,840
SE	Aluminium	9,883	1,965,290	1,975,173
SE	Cement	114,308	1,678	115,986
SE	Iron and steel	180,621	13,661	194,282

Table 2. The annual economic value that is predicted to be displaced from existing exporters, as the cost increases.

In sum, expanding CBAM to cover indirect emissions is likely to reinforce its protective function for EU producers while increasing cost pressures on importers in the covered sectors. By combining EXIOBase emissions data with ETS price assumptions and tariff elasticities, the modelling illustrates how the inclusion of indirect emissions could significantly alter trade flows—both through reduced demand for high-emission imports and through the displacement of economic value toward lower-emission suppliers. While this may create opportunities for Nordic actors, it also highlights the importance of strategic positioning, technological readiness and policy coordination to benefit from these shifts. Ultimately, the results underscore that an expanded CBAM would not only reshape sectoral trade dynamics but also influence industrial competitiveness and the geography of emissions across global value chains.

7.2 Incentives for third countries to introduce emissions pricing

From 2026, EU importers of goods that fall under CBAM must buy CBAM certificates. Number of certificates will correspond to the amount of emissions embedded in the goods imported. The price per certificate will be calculated based on a weekly average auction price of EU ETS allowances, €/tonne CO2. However, if a carbon price already has been paid in the country of origin during production, the amount paid can according to Article 9 of the CBAM Regulation be deducted in accordance with the price paid in the country of origin during production (European Commission, n.d.a). Hence, importing companies are allowed to account for costs incurred under a third-country carbon pricing instrument (CPI) covering the embedded emissions of CBAM products. However, evidence is needed of the carbon price paid in the country of origin (third country), to declare the price that has been paid for the embedded emissions in the imported CBAM goods. In August 2025, the European Commission set out an initiative to provide feedback for the methodology of converting CBAM certificates to the carbon price paid in a third country(European Commission 2025). The commission is planning to adopt a methodology by the first quarter of 2026. The price paid can either be interpreted as the average price for a certain period of time (e.g. quarterly if prices fluctuate) or the actual price paid (Wildgrube et al., 2024). By allowing carbon pricing mechanisms in third countries to be deducted from the CBAM certificates also avoids double counting, which would strengthen the defence for CBAM under international trade law and reduce opposition. This could, in turn, incentivise third countries to adopt carbon pricing mechanisms (Stockholm Environment Institute, 2022).

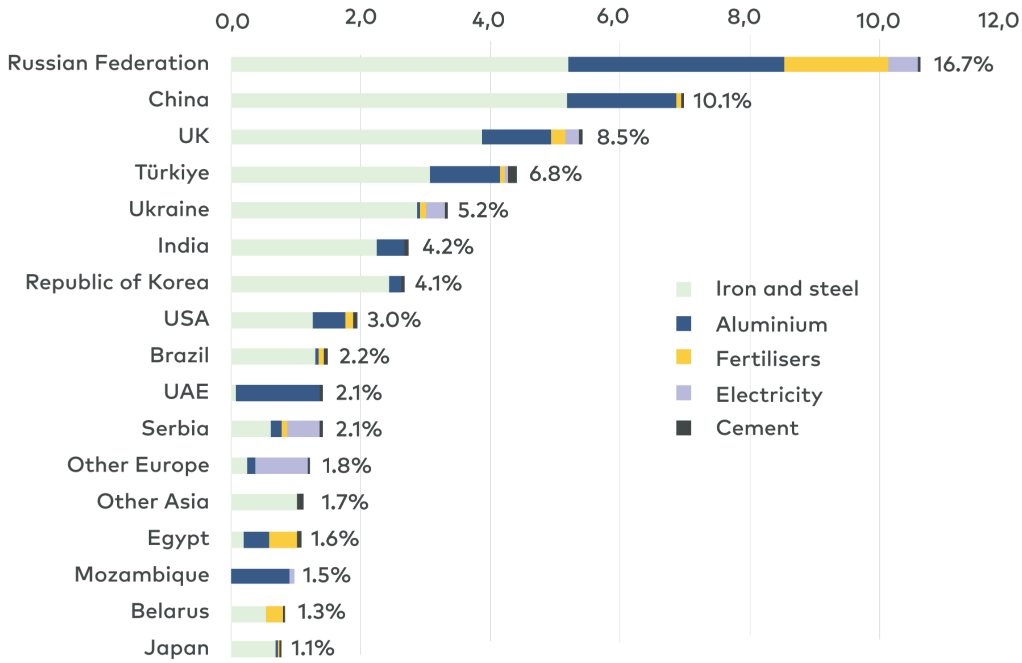


Figure 12. Top 10 exporters of CBAM goods to EU27. Numbers are presented in annual average billion USD, 2015–2019 (Wildgrube et al., 2024). It should be noted that exports from Russia may have changed since the invasion of Ukraine, as several sanctions have been put on Russian products entering the EU.

The figure above gives an interesting picture of the countries that constitute the biggest share of imports to the EU across the different sectors. It shows that iron and steel by far, constitute the largest share of imports to the EU, followed by aluminium and fertilisers.

Carbon pricing is already a widespread policy in third countries. According to CO_2-IQ, there is 18 non-EU countries with relevant CBAM carbon pricing implemented at national level (Sirressi, 2024). Of CBAM relevant sectors, 16 of the countries have implemented, or scheduled, carbon pricing for the Iron & Steel sector, 13 of the countries have carbon pricing for aluminium, 12 for fertilizers and 16 for cement. All 18 countries have CBAM-relevant carbon pricing for electricity (Sirressi, 2024).

	Countries (out of 18) that have implemented or scheduled implementation for CBAM-relevant carbon prices	Total embedded emissions in CBAM-sector
Iron & Steel	16	54%
Aluminium	13	35%
Fertilizers	12	13%
Cement	16	37%

Table 3. Numbers adopted from CO2-IQ article (Sirressi, 2024), originating from CO2-IQ database for CO2 Price Radar as well as trade data from Eurostat COMEXT 2023.

The incentive for third countries to implement a carbon-pricing mechanism in CBAM sectors is primarily founded in the benefit of the revenue of the policy. If a third-country implements a carbon-pricing mechanism, the levy is paid in the home country, ultimately increasing welfare in the country where the production is happening instead of paying the EU. This is also referred to as carbon revenue leakage. According to a global carbon price forecast of Wood Mackenzie (2023b), in the long term, the coverage of carbon pricing will increase substantially with the financial obligations of the CBAM. However, in the short term, implementing carbon pricing is only incentivized if the country exports a substantial part of its CBAM covered goods to the EU.

Of the top exporting countries of CBAM goods (see figure 12), as of writing this report all countries, but Russia and the United Arab Emirates have implemented or is developing a CBAM relevant carbon pricing mechanism. Most recent are Turkey, Brazil and Ukraine, where these are still in its developing and implementing phase. However, other economic instruments might still be in place, that has an indirect effect on less carbon intensive alternatives, without pricing the direct emissions. This could for example be subsidies, taxes or feed-in tariffs. A feed-in tariff incentivises renewable energy by guaranteeing a specific price from electricity produced by renewable sources, fed into the grid. Furthermore, other voluntary measures like offsets or carbon credits are not recognised either. Hence, many types of domestic carbon pricing mechanisms must be defined and specified to which ones are eligible for deduction under CBAM (Wildgrube et al., 2024). Of all the top exporters, only the UK has a carbon price that is equivalent to the current EU ETS yearly average price level.

According to an OECD report on CBAM effects along the supply chain, country-level results indicate that CBAM imposes a shift in demand towards countries that either has a carbon pricing mechanism in place or has low-emission intensity production in place. Results show that emission intensity (kgCO2/€) has a positive impact, even though modest, on the value added for the exporting country. For example, production that relies on electricity rather than fossil fuels, is positively affected by CBAM. This indicates that CBAM potentially could have a positive effect on third countries to introduce a carbon pricing instrument and change towards lower emission production alternatives (Dechezleprêtre et al., 2025).

In an analysis from the Swedish Environmental Protection Agency (2022), the effect on third countries is also evaluated. The report discusses countries like China, who is an important exporter of e.g. steel and iron to the EU, but the EU market only constitutes a small share of total steel export for China (4% in 2023(Eurostat, 2025a)). It can therefore be assumed, that since the EU constitutes such a small share of total steel and iron export, China is unlikely to change its climate policy regulations because of a price increase due to CBAM. Other countries on the other hand, where the EU market constitute a larger share of the third country´s total exports, will likely be more affected by the introduction of CBAM and hence more willing to change internal climate regulations, e.g. by introducing a carbon pricing mechanism equivalent to CBAM. Example of more affected countries are Ukraine, Belarus and Moldova who are more dependent on exports to the EU, and where the carbon pricing under CBAM will have bigger impact on the national economy (Naturvårdsverket, 2020).

Third countries exporting to the EU have also expressed concern about CBAM. Especially developing countries in Africa have expressed worry that CBAM will apply an extra economic burden on them, undermining their competitiveness and industrialisation development. Most of these countries do not have a carbon pricing mechanism in place, nor low-emission technology in place (Pauw et al., 2022). In a joint statement from NGO´s as a response to the adoption of the CBAM proposal by the EU Parliament and Commission in 2021, five stakeholders[3] argue for increased financial support from the EU to African countries, to support climate finance investments in these countries. It is pointed out though, that the least developed countries, among them being many of the African countries, account for a small share of carbon emissions from imported goods to the EU. Only exception is Mozambique, which accounts for almost 8% of EU´s imports of aluminium. Therefore, the stakeholders argue that by giving an exemption to these countries, would not have major impact on carbon leakage, but rather ease administrative burdens and costs, which tend to be higher in developing countries. However, this is argued to be a less favourable solution in the long run, as it could cause a major

3. Carbon Market Watch, E3G, European Environmental Bureau, World Wide Fund, Climate Action Network Europe

delay in technology investments in these countries, leaving them even further behind in renewable technology development and production processes. Therefore, supportive measures from the EU, both in know-how and financial measures, is argued to be a more sustainable solution in the long run. This is suggested to be done by channelling revenues from CBAM towards climate action policies in third countries. Other third countries like the BRICS[4] countries state that CBAM is causing discriminatory trade barriers and opposes international trade rules. However, an important incentive to third countries to implement some sort of carbon pricing instrument, is that countries rather want their businesses to pay taxes or tariffs in their home country instead of paying to the EU (Pauw et al., 2022).

7.2.1 Implementation challenges and considerations

A part of the CBAM definitive regime (from 2026 onwards) is to provide an incentive for third countries to implement a carbon pricing scheme by offering deduction of carbon prices, that has been effectively paid for (European Parliament & Council of the European Union, 2023), avoiding double counting. However, designing a successful deduction system of third-country carbon pricing in terms of CBAM goods encompass a few challenges.

First of all, converting third country pricing (monetary) values to CBAM certification-quantity values can prove to be challenging (see Wildgrube et al., 2024). Second, calculating these values depend on the approach and methodology to do so. Currently, the approach to this is not specified by the Commission, but following the amendments made to the regulation due to the Omnibus package, it is noted in Article 9(4) that a methodology for third countries default carbon prices will be developed and published in the CBAM registry by 2027. How well these calculations are able to capture cases such as multi-product installations are discussed in depth in Wildgrube et al (2024). The main challenge here is based on cases where facilities produce several primary products where some fall under CBAM and some does not. The case of ammonia is highlighted, as ammonia is both a part of the production of fertilizer (part of CBAM) and explosives (not part of CBAM). When a producer pays a carbon cost affiliated with both CBAM and non-CBAM products, it's important to distinguish between the production to make sure that producers are only being deducted for CBAM goods and not their overall carbon price paid in their home country (Wildgrube et al., 2024).

In an impact assessment from the EU Commission on potential effects from a CBAM implementation, various policy mix options are compared and assessed, where views from stakeholders from the CBAM public consultation has been considered as well. Stakeholders that participated in the public consultation believe

4. Brazil, Russia, India, China, South Africa

that CBAM can encourage more ambitious climate policies in third countries, because it incentivises revenue generation from carbon pricing on the domestic market, rather than the EU. The highest level of agreement was among citizens and civil society organisations, whereas business organisations were somewhat more sceptical about the positive effect on third country incentives to abate emissions. Lastly the assessment suggests what indicator and data input can be used to monitor the impact from CBAM on third country production processes. The indicator suggested is *Evolution of actual emissions for CBAM sectors in third countries*, where the level of emissions demonstrated by third country producers subject to the CBAM can be used to measure the impact (European Commission, 2021).

The case of subnational carbon pricing systems also needs to be considered in the reimbursement framework. Several nations have emissions trading systems, crediting mechanisms or carbon tariffs at state or regional level, such as the US, China, Mexico and Canada (World Bank Group, n.d). For instance, in the US the state of California has implemented carbon prices at the state border but does not count as a national carbon price. This means, that goods imported from the state of California will not have their carbon pricing deducted unless the framework allows for subnational carbon pricing mechanisms. If these are not met, it is plausible that the competitiveness of Californian goods may be affected poorly relative to states without carbon pricing. According to the World Bank Group, there is, as of 2025, a total of 44 subnational jurisdictions using carbon pricing which is not a negligible amount.

7.3 Sectoral considerations for CBAM expansion

Since CBAM was originally passed, it has been the intention to extend its scope. Extending CBAM to new sectors will pose new trade-offs for the affected sectors, benefitting some companies and adversely affecting others. In this section the potential sectors for expansion will be mapped, based on the available sources.

7.3.1 Sectors explicitly identified for possible CBAM expansion

In both the CBAM Regulation and the subsequent Omnibus amendment, several sectors were highlighted as candidates for a future extension of the CBAM scope. These sectors are characterised by high emissions intensity, significant trade volumes with third countries, or a high risk of carbon leakage—factors that make them likely candidates for future inclusion.

Organic chemicals

Organic chemicals—used widely in the production of pharmaceuticals, plastics, coatings, and industrial intermediates—are associated with substantial process emissions. The sector also has extensive global supply chains, and many EU producers compete directly with imports from regions with lower carbon constraints. Because of this combination of high emissions intensity and strong international competition, organic chemicals have been singled out as a potential next wave of CBAM-covered products.

Polymers

Polymers, particularly plastic polymers such as PE, PP, PET or PS, have high embodied emissions linked to energy-intensive production and fossil feedstocks. The EU imports significant volumes of polymers from countries with varying carbon regulations. Extending CBAM to polymers could therefore address competitive distortions while supporting EU objectives on circularity and decarbonisation in plastics value chains.

Downstream products

Downstream products refer to more processed goods that incorporate inputs already covered by CBAM sectors. At present, only iron and steel products fall under this definition. Including further downstream products would reduce the incentive for importers to circumvent CBAM by shifting to more processed goods outside the current scope. Such an expansion could be particularly relevant for mechanical components, machinery, and assembled products where iron, steel, or aluminium constitute a significant share of the embedded emissions.

7.3.2 ETS-covered sectors

The EU ETS already regulates a large share of industrial emissions. The sectors listed below are currently covered under the ETS, and several of them are also included in CBAM. Understanding the overlap between ETS- and CBAM-covered sectors is important, as it determines how the phase-out of free allowances will affect different industries and how CBAM may interact with existing regulatory frameworks.

Industry / Sector	
Electricity and heat generation	Production of glass
Oil refineries	Production of ceramics
Steel works	Production of pulp, paper and cardboard
Production of iron	Production of acids (general), and production of nitric, adipic and glyoxylic acids and glyoxal
Production of aluminium	Production of bulk organic chemicals
Production of metals (other than iron and aluminium)	Aviation (EEA internal flights and flights departing to Switzerland and the UK)
Production of cement	Maritime transport (50% of emissions for voyages starting/ending outside EU, 100% between EU ports and within ports)
Production of lime	

Table 4. Overlap between EU ETS-covered sectors and CBAM-covered products

The sectors subject to both ETS and CBAM will face the strongest regulatory pressures going forward, as they are exposed to rising carbon prices domestically and increased scrutiny at the EU border. This dual exposure may accelerate investments in low-emission technologies but also increases the risk of competitiveness loss, particularly for trade-exposed sectors with limited substitution possibilities. For sectors covered only by the ETS, the gradual phase-out of free allowances will still impose higher costs, though without the protective effect of CBAM.

7.3.3 Other sectors

Economic analyses have shown that expanding CBAM to cover both imports and exports could more effectively prevent carbon leakage by ensuring that European producers are not disadvantaged in global markets. Since CBAM increases production costs within the EU, export-oriented companies may require compensation or partial refunds of carbon costs to maintain competitiveness when selling to countries without equivalent carbon pricing. Such an export adjustment mechanism could help preserve market access while supporting the transition to low-emission production.

However, extending CBAM to exports introduces legal and practical challenges, particularly with respect to World Trade Organization (WTO) rules and the risk of being perceived as a protectionist measure (Kuusi et al., 2020). It would also require clear criteria for eligibility, robust monitoring systems and careful alignment with existing ETS rules.

Importantly, the development of carbon tariffs is closely linked to the gradual phase-out of free emission allowances under the EU ETS. This is a necessary step to maintain the environmental integrity of CBAM and align with EU climate targets. Yet it may also temporarily reduce the competitiveness of energy-intensive exporting sectors. As a result, some products may see a decline in exports despite the introduction of CBAM, especially in sectors where low-carbon alternatives are not yet scalable or commercially viable.

8. Institutional setup and early challenges in implementing CBAM

Under the CBAM framework, each EU Member State is responsible for its own national implementation of the regulation. While the European Commission oversees central functions including certificate pricing, registry management, and enforcement coordination, each Member State must appoint a competent national authority to handle local procedures.

This chapter first outlines the general design of CBAM and the EU-level responsibilities under CBAM, then maps how Denmark, Finland, and Sweden have structured their national implementation—detailing the institutional setups and designated authorities in each country.

8.1 EU-level

As mentioned earlier, the implementation of CBAM happens gradually starting with a transitional phase before the CBAM regime is fully implemented in 2026. The transitional phase serves as a trial period to gather data and improve on methodologies and there have been no CBAM certificates purchased or surrendered during this phase, however failure to report can still lead to penalties. The reports include direct and (for some) indirect emissions, as well as any carbon price paid in the country of origin. To access the CBAM Registry, the company must be registered as an importer and have an EORI number.

In 2025, CBAM declarants can apply via the CBAM Registry to achieve the status of \`authorised CBAM declarant\`. Their application is processed by the National Competent Authority of the EU Member State where the importer is established. This status will become mandatory as of 1 January 2026 for the import of CBAM goods into the EU customs territory. The authorisation process involves applying through the EU's CBAM system and meeting the Regulation criteria including proving the ability to fulfil reporting and compliance obligations.

When the definitive CBAM regime goes into force from January 2026, all importers must purchase and surrender CBAM certificates annually to cover the embedded emissions of imported goods. Only authorised CBAM declarants are permitted to import CBAM covered goods. Each importer will submit an annual declaration (replacing quarterly reports) detailing the emissions embedded in their CBAM covered imports of the previous year and surrender a corresponding number of certificates. Importers can buy CBAM certificates from their national authorities. The price of the certificates will be calculated depending on the weekly average auction price of EU Emissions Trading System (ETS) allowances (€/tonne CO_2 emitted) (European Commission, n.d.b). The certificates are from an EU-wide registry, and certificates cannot be traded between companies, only purchased and redeemed via the official platform. If importers can prove that a carbon price has already been paid during the production of the goods, the corresponding amount can be deducted.

The European Commission provides the central electronic systems including the online CBAM Transitional Registration Platform, where all importers are required to register to become a CBAM declarant (access is approved by their national competent authority).

8.2 Denmark

Denmark adopted *Act on supplementary provisions to the CBAM Regulation* (Law no. 1452 of 10 Dec 2024; L 17), to establish domestic legal basis to implement CBAM (Klima-, Energi- og Forsyningsministeriet, 2024b). The Minister for Climate, Energy and Utilities designate the competent authority and holds core supervisory powers. The designated national competent authority in Denmark is the Danish Energy Agency (Energistyrelsen). However, Denmark has chosen a tripartite division of responsibilities between the Danish Energy Agency, the Danish Business Authority and the Danish Customs Agency, this mirrors the Danish setup for handling the EU Emission Trading Scheme.

Transitional phase
As the national competent authority, the Danish Energy Agency is the lead agency for CBAM in Denmark. In the transitional phase, the Energy Agency's primary role is oversight of reporting and guidance. It publishes detailed guidelines for importers on how to comply with CBAM reporting requirements and advises companies on methodologies for calculating embedded emissions, instructing importers to use actual production data and providing procedures when data are unavailable (Energistyrelsen, 2024). The agency can access the CBAM registry (as NCA) to monitor Danish importers' reports and is tasked with verifying the accuracy of reported data. If irregularities or omissions are found, the Energy Agency can issue orders to companies to correct or provide information (Klima-, Energi- og Forsyningsministeriet, 2025a).

During the transitional phase the Danish Customs Agency (Toldstyrelsen) is responsible for sending out notification letters to companies who have imported CBAM covered goods every quarter of the year, the notifications are send via Digital Post (Digital Post is the mail service Danish public authorities use to communicate digitally with citizens and companies). If an importer did not receive a notice for a given quarter, no CBAM report is required for that period (Energistyrelsen, n.d).

It is the Customs Agency that facilitates access to the EU Commission's CBAM registry and is responsible for providing companies guidance on how to attain access to the EU CBAM registry. Companies need to attain access before they can apply for authorisation as a CBAM declarant (Erhvervsstyrelsen, 2025).

The Danish Business Agency (Erhvervsstyrelsen) is responsible for processing and approving applications to become a CBAM Declarant, it is therefore the Danish Business Agency that provides guidance on how to apply for authorisation. The agency has contacted all companies covered by CBAM directly via Digital Post with instructions for the application module (Energistyrelsen et al., n.d).

The definitive regime

In the definitive regime, The Energy Agency's continues to handle the technical and regulatory oversight of CBAM and is responsible for control and enforcement. From 1 April 2026, imports (≥ 50 tonnes/year) of CBAM goods will only be allowed if the company is an authorised CBAM declarant or has a pending application. If this is not the case customs will stop further import until the company is improved. Companies that fail to apply beforehand and attempt to import significant quantities of CBAM goods can thus expect their shipments to be stopped at the border (Erhvervsstyrelsen, 2025).

Authorities control and enforcement

After each completed reporting period the Danish Energy Agency receives a list from the European Commission of importers who have not fulfilled their reporting obligation. Failure to fulfil the reporting obligation applies in cases where a CBAM report has not been submitted within the respective deadline, or when the European Commission can demonstrate deficiencies in the report submitted. In both cases, the importer will be contacted by the Energy Agency to prompt submission of the CBAM report or with a view to remedying deficiencies in the submitted report. In the event of repeated failures to meet the reporting obligation, or in cases where the importer opposes remedying its deficient reporting, the Energy Agency may sanction the importer with a fine (Energistyrelsen, 2024).

Company support

Danish authorities have invested in guidance, outreach, and support tools to help companies navigate the new CBAM requirements and are using multiple platforms in their communication efforts – websites, business portals, direct mail, webinars, and helpdesks. The Energy Agency, Customs Agency, and Business Authority have each developed resources in their areas of responsibility, while also partnering on joint guidance initiatives, and they all have established public contact points for CBAM queries (Erhvervsstyrelsen, 2025).

Administrative Fees
Denmark has chosen to establish a system of annual fees for CBAM declarants: the Danish Energy Agency will charge each authorized CBAM importer a yearly fee to cover the costs of administering CBAM. Pursuant to the *Act on supplementary provisions to the CBAM Regulation*, the Danish government issued Executive Order No. 1500 of 10 December 2024 (*Bekendtgørelse nr. 1500 af 10. December 2024*), which entered into force on 1 January 2025 together with the Act. This executive order specifies the administrative procedures and financial provisions for Denmark's implementation of CBAM and sets the fee at DKK 2,760 for the year 2025, and DKK 2,440 from 2026 onwards. The order specifies payment procedures, and that late payment may incur interest and reminder fees (Klima-, Energi- og Forsyningsministeriet, 2024c). This fee mechanism is to ensure that Denmark can fund the necessary compliance monitoring and support tasks as CBAM scales up.

8.3 Finland

In Finland, the Finnish Customs Authority (Tulli) has been designated as the competent authority responsible for the implementation and oversight of the CBAM regulation. Therefore, will the customs authority in Finland act both as customs authority and as the national competent authority (Tulli, 2024a).

Transitional Phase
In 2023, the Finnish Ministry of Economic Affairs and Employment appointed a working group to prepare the implementation of the CBAM regulation in Finland. The working group included participants from several ministries, the energy agency and industry representatives among others (Työ- ja elinkeinoministeriö, 2023).

The Finnish CBAM Implementation Act 2023/956 implemented in 2023 specifies Customs' enforcement powers, the obligation for importers to obtain authorisation, and the penalties for breaches. Finnish Customs have served as the competent national authority under the Carbon Border Adjustment Mechanism Regulation since January 2024 (Työ- ja elinkeinoministeriö, 2024a).

During the transitional phase Finnish Customs has been responsible for providing guidance for companies including how to access the EU Transitional CBAM Registry, delegate reporting authority, and submit quarterly emission reports. Finnish Customs is also in charge of processing and approving authorization applications to become authorised CBAM declarant. Beginning in early 2025, companies have been urged to apply for the authorized declarant status to avoid any disruption to imports (Tulli, 2025). Companies importing CBAM covered goods are notified that their imports are covered by the CBAM when they receive their customs clearance notice by the Customs Agency (Tulli, 2024b).

Definitive Regime
Finnish Customs is responsible for granting authorised CBAM declarant status, managing importer access to the EU CBAM (Työ- ja elinkeinoministeriö, 2024b). At import, Customs checks whether the goods are within CBAM scope and verifies that the importer holds valid authorisation. Imports by non-authorised declarants are not permitted. Finnish Customs may impose penalties for failure to comply with CBAM obligations (Tulli, 2024a).

Authorities control and enforcement
From the start of 2026, Finnish Customs can carry out audits and enforcement actions to ensure compliance. These include checking annual declarations submitted by authorised CBAM declarants. Audits may involve on-site inspections at company premises, conducted by Customs' corporate auditors. Finnish Customs is entitled to obtain any information from importers that is required for CBAM supervision under the Regulation. If companies neglect their reporting or other CBAM obligations, Customs is authorised to impose penalties. The penalty structure follows the EU CBAM Regulation and relevant national legislation (Tulli, 2024a).

Company support
Finnish customs have been responsible for providing company guidance. In 2023, Customs set up a dedicated CBAM-information webpage and published instructions in Finnish, Swedish, and English to help importers understand the new requirements, providing guidance for the transitional phase and the definitive regime. Support have included guidance, information events, e-mail newsletters and notifications. Finnish Customs established a helpdesk including an advice line (closed down in September 2025 due to low demand) and a designated email address (Tulli, n.d.).

8.4 Sweden

In 2024, Sweden adopted Act 2024:364 and Regulation 2024:365, containing supplementary provisions to the EU CBAM Regulation. The regulation designates the Swedish Environmental Protection Agency (Naturvårdsverket) as the national competent authority for CBAM, responsible for its implementation and oversight of compliance.

The Swedish Environmental Protection Agency collaborates closely with Swedish Customs in the implementation and execution of CBAM. Swedish Customs (Tullverket) also have responsibilities for the implementation and enforcement of CBAM in Sweden (Sveriges Riksdag, 2024a; Sveriges Riksdag, 2024b).

Transitional Phase
During the transitional phase, the Swedish Environmental Protection Agency provides guidance for companies on CBAM, including how to report CBAM-covered

goods, how to apply for CBAM declarant status, and how to calculate actual emissions. The agency is further responsible for ensuring that companies submit quarterly emissions reports as required (Naturvårdsverket, 2025b).

Swedish Customs is responsible for informing companies whether they have reporting obligations under CBAM (Tullverket, 2025b). Importers will receive a notification, when submitting a customs declaration for goods that fall under CBAM, that quarterly carbon emission reporting is required. I Swedish Customs is responsible for managing the technical access to the EU's reporting systems both the CBAM Transitional Registry and the permanent CBAM Registry. To log in, Swedish importers go through Customs' e-service platform (Tullverket, 2025a).

Any importer exceeding the de minimis threshold (which is set to 50 tonnes of CBAM-covered goods per year must be approved as an authorised CBAM declarant**.** As of 28 March 2025, it became possible for companies to apply for the status of authorised CBAM declarant. The application is submitted digitally via the EU central CBAM Registry. The authorisation process for all companies will be administered by the Swedish Environmental Protection Agency, who is responsible for processing and approving the applications for company importers to become CBAM declarants. The approval includes checks on the company's compliance record as well as its financial and organisational fitness, in line with EU rules (Naturvårdsverket, 2025b).

Definitive Regime

In the definitive regime, the Swedish Environmental Protection Agency will review the annual CBAM declarations submitted by authorised importers, which detail the previous year's imports and emissions. The agency verifies that importers surrender the correct number of CBAM certificates corresponding to their declared emissions.

From January 2026 onward, importers will no longer receive notifications regarding the declarant's reporting obligation. Instead, Swedish Customs will verify whether the goods fall under the scope of the CBAM Regulation and check whether the importer holds an authorised CBAM declarant status. If such status is lacking, importation of the goods will not be permitted (Tullverket, 2025b).

Authorities control and enforcement

As the appointed CBAM authority, the Swedish Environmental Protection Agency monitors and enforce compliance. It carries out audits and inspections of importers' CBAM reports and declarations, either on its own initiative or at the request of the European Commission. If an importer fails to meet their obligations (such as missing a report, under-reporting emissions, or not surrendering enough certificates), the agency may impose sanction fees in line with EU rules and Swedish law. Non-compliance during the transitional phase may also negatively impact an importer's application to become a CBAM declarant. The Swedish Environmental Protection Agency may revoke authorised CBAM declarant status in case of abuse or repeated violations, which would prohibit further imports of CBAM goods. To carry out these tasks, the agency cooperates with and receives data from other Swedish authorities (Naturvårdsverket, 2025c).

Company support
Swedish authorities provide extensive guidance to help companies navigate and comply with CBAM requirements. For technical or customs-related queries, Swedish Customs is the first point of contact, while for regulatory or reporting questions, the Swedish Environmental Protection Agency is the responsible authority. This division of responsibilities is clearly communicated so companies know where to turn.

The Swedish Environmental Protection Agency has established a CBAM information hub on its website and provide public contact points, including a telephone helpdesk (Naturvårdsverket, 2025b). Swedish Customs has likewise published practical instructions for importers. Its website offers user guidance for accessing the EU CBAM IT systems, as well as information on how to obtain company import statistics and correctly classify goods (Tullverket, 2025a).

Industry perspectives on CBAM implementation in Denmark, Finland and Sweden

Four interviews were conducted with Industry associations from all three countries, two from Sweden and one from Denmark and Finland. Interviews with industry representatives in Denmark, Finland, and Sweden show broad support for the principle behind CBAM but also highlight significant implementation challenges during the transitional phase. While experiences vary between countries, a clear pattern emerges: the administrative burden, data requirements, and EU-level system shortcomings have posed substantial difficulties in all three countries.

8.4.1 Common experiences across Finland, Sweden and Denmark

All industry representatives stressed that the implementation has been complex, rushed, and resource intensive. The short preparation time, delayed EU guidance, and early malfunctioning of the Commission's IT systems made compliance challenging for all companies regardless of their size. All described the process as confusing and burdensome, particularly for smaller companies, while Finnish industry characterised the early phase as "extremely challenging" due to unrealistic timelines and technical problems in the EU registry.

A key shared challenge relates to data collection from non-EU suppliers, particularly in China and India. All interviewees noted that suppliers often lacked the knowledge or systems to provide emissions data, significantly increasing administrative burdens. The need to report detailed input data for complex products, such as multi-component machinery, was highlighted repeatedly as a major barrier.

The administrative burden is highest for companies working with complex or downstream products, while basic industries are generally better positioned. Swedish industry emphasised that CBAM is much more difficult for manufacturing sectors handling thousands of components, a view echoed in Denmark, where companies importing steel and aluminium reported difficulties obtaining data from upstream suppliers.

8.4.2 Differences between national implementation models

While the overarching challenges were similar across Finland, Sweden and Denmark, industry representatives highlighted some differences in how national authorities organised their support and handled the early implementation phase. Finnish Customs was highlighted as supportive providing assistance during the difficult early phase. Swedish authorities, particularly the Environmental Protection Agency, were described as well-organised and responsive, offering helpdesks, reference groups, and clear information channels. Danish companies experienced difficulties navigating the tripartite division of responsibilities, with unclear points of contact and long response times. Despite the challenges companies experienced in reaching the correct authority, industry representatives emphasised positive aspects of their collaboration, including authorities actively participating in industry webinars.

8.4.3 Sector-specific and strategic concerns

A general concern companies have raised is the risks of production shifting outside the EU, as finished goods imported from third countries may become cheaper than importing CBAM-covered raw materials. There are also concerns raised on export competitiveness, noting the lack of a functioning export mechanism as free allocations are phased out.

8.4.4 Concluding reflections on industry experiences

Across all three countries, industry actors recognise CBAM as a necessary step toward fair climate regulation but emphasise that successful implementation will require stronger administrative support, clearer guidance and a more reliable EU-level IT infrastructure. Companies stress that the transitional phase has revealed practical challenges that must be addressed before the definitive regime begins — particularly regarding data collection from non-EU suppliers, coordination across national authorities and the unresolved question of export competitiveness as free allowances are phased out.

Overall, industry perspectives underline that compliance alone will not be sufficient; effective CBAM implementation must be paired with policy stability, technological support and dialogue between authorities and businesses to ensure that decarbonisation does not lead to unintended competitiveness risks.

9. Uncertainty factors for CBAM regulation

The omnibus package proposed on 26 February 2025 is a legislation aimed at simplifying reporting and lessening administrative burdens for companies reporting on e.g. CBAM. In the omnibus package, the de minimis requirement for being subjected to CBAM reporting has changed to a de minimis mass threshold of 50 tonne annual imports across sectors (2025/0039 (COD), 2025). This is expected to exclude 90% of companies from reporting and paying for their imported embedded emissions. The regulation is expected to still capture 99% of imported embedded emissions within iron and steel, aluminium, cement and fertilizers. Hydrogen and electricity are not included in the mass threshold. (European Commission, 2025)

The reduction in CBAM's scope has the potential to significantly change the impact of CBAM in Europe and in the Nordics. Other than increasing the import threshold to exclude 90% of importing companies, the Omnibus also aims to simplify the reporting burden by delaying reporting deadlines (Article 1(4)), allowing reporting on default emission factors (Article 1(7)), and by delaying the phase-put of free allowances to 2027(Article 1(14)). The simplification has the possibility to significantly decrease the administrative burden, while capturing almost the same level of tariffs on importers.

Other uncertainty factors include the potential treatment of exports outside the EU market. Some industries have argued for export rebates to compensate for higher production costs resulting from the EU ETS and CBAM when competing in global markets. However, there is currently no agreed EU-level legislation providing for such export rebates, and their introduction would raise significant concerns regarding compatibility with WTO regulations. As a result, export rebates remain an uncertain and contested policy option rather than an established element of the CBAM framework.

Other uncertainties for 3rd countries: Will the CBAM tariffs be used to fund development in 3rd countries.

9.1 Impact of the Omnibus package

As part of the Omnibus package, the regulation *2025/2083 of 8th of October amending Regulation (EU) 2023/956 as regards simplifying and strengthening the carbon border adjustment mechanism* amends the original CBAM regulation, aiming to simplify and strengthen the regulation. The regulation is expected to still capture 99% of emissions from imports, while exempting 90% of importers from reporting requirements. These estimates are provided at the EU aggregate level, and the regulation does not specify corresponding country-level impacts. As a result, while CBAM's overall environmental and economic incentives are expected to remain largely unchanged at the EU level, the effects in individual Member States, including Finland, Sweden and Denmark, may differ depending on national import structures and the concentration of large importers. On this basis, CBAM's impact on Nordic producers is not expected to change materially in aggregate terms, but the precise distributional effects of the Omnibus package at national level cannot be quantified based on the available information.

Importers that are covered by CBAM, will still be faced with increased prices on imports from third countries. The companies that are not exempt in the Omnibus, will naturally be larger companies, with a higher revenue, or a more direct focus on import of CBAM-covered goods. Although the administrative burden on the non-exempt companies will be significant, it is expected that they will have more resources to allocate to the reporting.

The results of this report are expected to largely remain relevant with the implementation of the CBAM Omnibus. Due to the changes in requirements in the CBAM, some of the conclusions drawn in the report might change. In Table 3 is an overview of expected effects of the Omnibus, divided by section of the report.

Section	Negative impact	No change	Positive impact
Section 5.1 – Macro level impacts	90% of companies (likely SME's most of them) will no longer be forced to look into CO_2-emissions in their value chains. The remaining 10% can use generic emission factors	The remaining 10% of companies will not be impacted by the Omnibus.	
		There is still the issue with e.g. imports of downstream products, rather than basic products.	Many small companies in Finland, Norway and Sweden will not have to raise prices to cover fee.
Section 5.2 – Competitiveness in the Nordics	For 90% of companies, incentive to switch suppliers is removed.	99% of emissions will still be captured, meaning the systemic effect largely remains.	For 90% of companies, fees and administrative costs are removed.
Section 6 – Impact on consumption-based emissions	Omnibus allows for generic emission factors to be used, which increases uncertainty.	Most of impact calculations, and synergy with national inventories will not be impacted.	
Section 7.2 – 3rd country emission pricing		99% of third country emissions, will still be caught. This likely leads to 99% the same impact as the original CBAM.	
Section 7.3 – Sectoral considerations			An evaluation has been scheduled to be completed in late 2025, which includes possible ETS industries to expand into, but was not available by the finalisation of this report.
Section 8 – CBAM implementation			The Omnibus significantly decreases the workload of NCAs and grants them more power and tools.

Table 5. Changes to the conclusions of the report, from the CBAM Omnibus.

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