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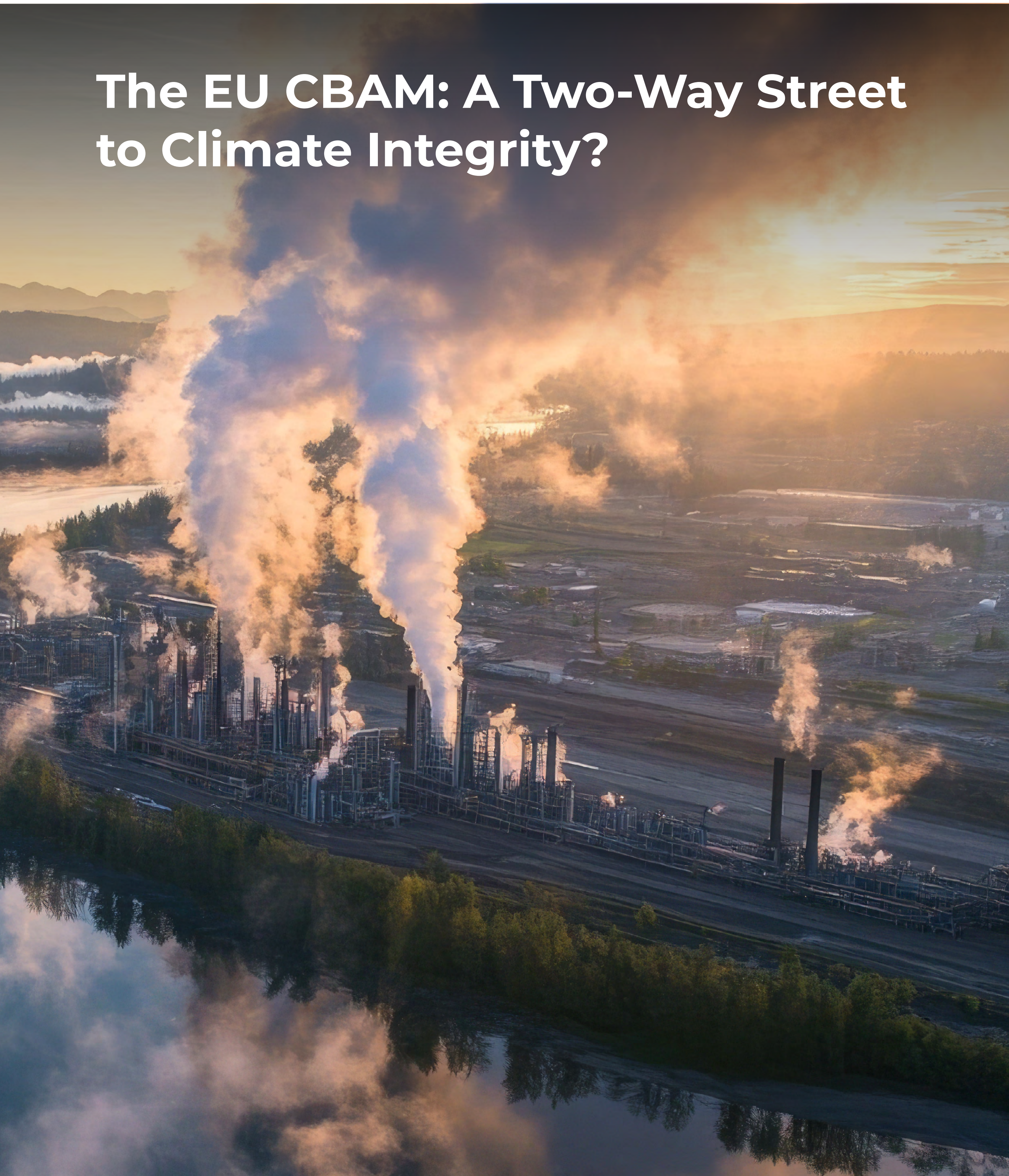
The EU CBAM: A Two-Way Street to Climate Integrity?



Acknowledgements

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Authors

This report was written by Adrien Assous, Chloé Barré, Duncan Woods, and Meili Vanegas-Hernandez, from Sandbag.

Adrien Assous is Sandbag's Executive Director. He has led all Sandbag's work on the EU ETS and CBAM since joining in 2020. With over two decades of experience in the financial sector—mostly on carbon markets and energy financing, he has chaired the UK-based climate think tank Ember and served on the board of the Climate Market and Investment Association.

Meili Vanegas-Hernandez is a Data and Policy Analyst at Sandbag, where she has led the development of analytical tools, including Sandbag's CBAM models and simulators since 2023. Meili previously worked across sectors including transport, communications, and urban mobility. She holds an MSc in Systems and Computing Engineering from Los Andes University, with a focus on data analysis.

Duncan Woods is an Industrial Decarbonisation Analyst at Sandbag, where he leads research on industrial decarbonisation technologies and policies, including on CBAM extension to polymers, refinery and chemical products. Before joining Sandbag, he worked as a consultant at Ricardo, focusing on energy and carbon regulation. He holds a PhD in Chemistry from the University of Liverpool, specialising in sustainable hydrogen production.

Chloé Barré is a Data Analyst at Sandbag, where she leads research on industrial electrification, including on CBAM possible extension to indirect emissions (from electricity use) embedded in imported goods. Her past work applied physics models, inference, and machine learning to neurobiology. She holds a PhD in Physics from Sorbonne University.

Contents

Abbreviations Table

Abbreviation	Meaning
ALCR	Activity Level Change Regulation
BF-BOF	Blast Furnace – Basic Oxygen Furnace
CBAM	Carbon Border Adjustment Mechanism
CBAM COM	CBAM European Commission Portal
CBAM DP	CBAM Declarants Portal
CBAM NCA	CBAM National Competent Authorities Portal
CBAM Operator	CBAM Operators Portal
CN	Combined Nomenclature – EU classification of goods for trade
CN8	8-digit code in the Combined Nomenclature used to identify specific goods
CO2e	Carbon Dioxide Equivalent – a standard unit for measuring carbon footprints
CSCF	Cross-Sectoral Correction Factor
DA	Delegated Act – a legally binding act by the European Commission to supplement or amend EU legislation
DG	Directorate-General – a department of the European Commission responsible for specific policy areas
DG TAXUD	Directorate-General for Taxation and Customs Union – the European Commission body responsible for CBAM
DMF	Dimethylformamide – a solvent used in chemical processing
DRI	Direct Reduced Iron
EAF	Electric Arc Furnace
EC	European Commission – the executive branch of the EU responsible for proposing legislation and enforcing EU laws
ETS	Emissions Trading System
FA	Free Allocation
FAR	Free Allocation Regulation
HS	Harmonised System – international product classification system developed by the World Customs Organisation (WCO)
HSFO	High Sulphur Fuel Oil
IA	Implementing Act-a binding legal instrument adopted by the EC to ensure uniform implementation of EU legislation across all Member States
ICC	Indirect Cost Compensation
MPV	Monitoring Plan Verification
NAT	National Allocation Table
NIM	National Implementation Measure
RMF	Residual Marine Fuel
SCR	Secondary Conversion Rate

1. Executive Summary

The Carbon Border Adjustment Mechanism (CBAM) is an EU climate policy, rather than an international trade policy. It aims to replace the current system of free allocation of emission allowances to EU-based manufacturers under the EU carbon market, which is a major obstacle to industrial decarbonisation in Europe. Replacing free allocation is therefore an essential piece of the EU's increased climate ambition. The CBAM could enable the removal of up to 432 million free allowances per year, worth **€35 billion no longer given to EU factories.**

The combined implementation of the CBAM and phaseout of free allocation will increase production costs for both EU and third country producers, which will push up the selling price of CBAM goods in EU markets. In addition, third country producers are able to minimise CBAM costs by strategically selecting inputs and processes so as to export to Europe goods with lower declared emission intensity (**resource shuffling)**. Some **exporters might therefore increase profit on their product sales**.

If third countries keep trading with the EU "as usual", the CBAM in its current scope could collect **€11.3 billion** in fees annually. CBAM fees can be reduced to **€7.3 billion** (worldwide) if third country producers do resource shuffling, and further down to **€7.0 billion** if their national authorities set up carbon pricing.

The real cost of the CBAM to third countries should however take into account extra revenues expected from the sale of goods into Europe at higher prices. Once these revenues are factored in, the net cost of the CBAM is reduced to **€5.0 billion** across all countries under business-as-usual conditions and in the scheme's current coverage. This goes down to **€995 million** if exporters do resource shuffling, and to only **€715 million (about 0.07% of the value of imports)** if all trade partners implemented a €50 carbon price.

Resource shuffling is a way of minimising CBAM costs and sometimes profiting from the scheme. **However, such practice does not reduce emissions and could hinder the EU's efforts in phasing out free allocation in the EU ETS.** This may press the EU to change some of the rules to reduce the gains achievable through resource shuffling.

It is therefore not preferable for EU trade partners to build long-term strategies based on resource shuffling. In contrast, implementing carbon pricing makes it possible for third countries to dramatically reduce CBAM costs- and even benefit from the mechanism-- while creating real emission reduction incentives. It also makes third country producers indifferent to changing EU emission reporting rules, thereby reducing uncertainty.

2. Origin of the CBAM: the EU ETS

The European Union's Carbon Border Adjustment Mechanism (CBAM) started applying to imports into the EU on 1 October 2023.

2.1 An alternative to free allocation

The introduction of a CBAM was first presented by the European Commission in 2019 as "an alternative to the measures that address the risk of carbon leakage in the EU's Emissions Trading System"[1] (EU ETS) as the EU steps up its ambition. Carbon leakage designates the displacement of emissions from jurisdictions with more to less stringent climate policies, through the displacement of production, investments or fossil fuel consumption.

The EU ETS covers emissions from the power and heat, industry, aviation and shipping sectors, requiring that emitting installations, airlines and shipping companies surrender emission allowances (EUAs) equivalent to their annual emissions of carbon dioxide, nitrous oxide and perfluorocarbons, while decreasing the amount of permits available each year. Companies source these EUAs either by purchasing them from auctions, from the market or, in the case of most industrial plants, receiving them for free.

The free allocation of allowances was initially put in place as a protection against the risk of carbon leakage.[2]

Initially, allowances were allocated for free to the majority of installations covered by the EU ETS. Since 2013, with a few exceptions, installations in the power sector have not received free allowances. Industry actors, however, continue to do so: in sectors deemed at risk of carbon leakage, 92% of emissions were still covered by freely granted allowances in 2023 (down from 99.9% in 2020).[3]

In her political guidelines for the next European Commission 2019-2024[4], Ursula von der Leyen's first priority was the introduction of a European Green Deal, aimed at making Europe the first climate-neutral continent. To complement this ambition, the text reads, she would introduce a Carbon Border Tax to **avoid carbon leakage and create a level-playing field.** The European Green Deal[5] includes similar language: "Should differences in levels of ambition worldwide persist, as the EU increases its climate ambition, the Commission will propose a carbon border adjustment mechanism, for selected sectors, to reduce the risk of carbon leakage".

2.2 Why should free allocation be phased out?

As the origin of the CBAM, one may wonder why it is so important for the EU to phase out free allocation in its ETS?

1 Communication on the European Green Deal, European Commission, December 2019

2 Carbon Leakage: Theory, Evidence and Policy Design, Partnership for Market Readiness, October 2015

3 Sandbag calculations based on Verified Emissions Data, European Union Transaction Log.

4 A Union that strives for more - My agenda for Europe, Ursula von der Leyen, July 2019

5 Communication on the European Green Deal, European Commission, December 2019

2.2.1 Competitive distortions

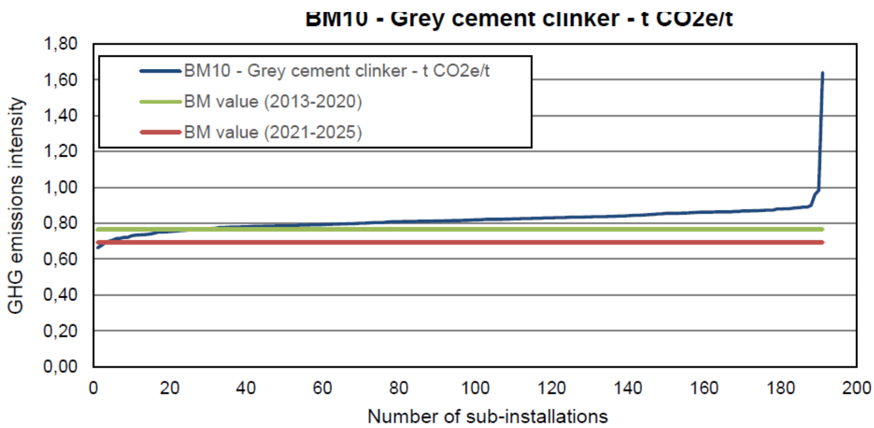
The free allocation (FA) of emission permits is the dominant regime for EU industry plants, as 92% of them receive a number of them that matches 100% of their "benchmarks". Free allocation benchmarks are the number of permits given per unit of output and are set based on the EU's 10% most performant plants, as per the (simplified) formula:

$$Free\ Allocation_p = 100\%\ benchmark_p \times volume\ produced_p$$
$$p = a\ specific\ product\ or\ process$$

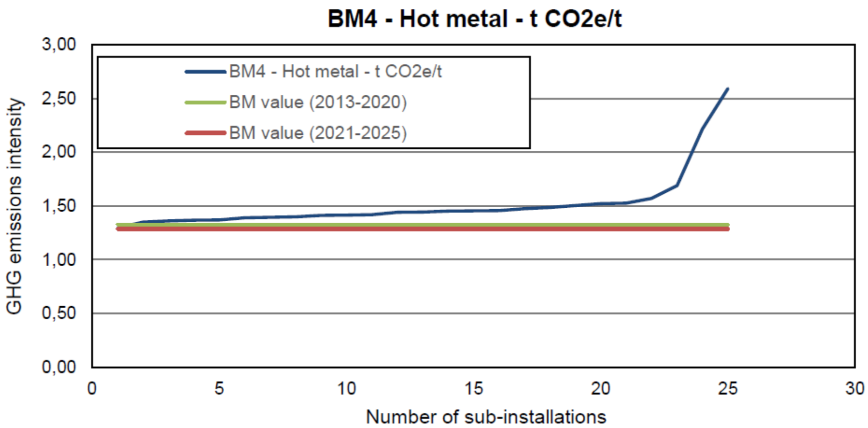
Benchmarks are tied to products or production process, so that, for example, cement makers receive 0.693 allowances for each tonne of grey clinker produced, whereas steelmakers receive 1.288 allowances for each tonne of hot metal (pig iron) produced. So, the incentive to reduce emissions only works within what is achievable while producing the same amount of grey clinker or hot metal. This is a big problem, because the emission reduction potential within the scope of some benchmarks is extremely small, as illustrated by the horizontal shape of the curves in Figure 1 : Free allocation benchmarks and statistical distribution of emissions intensity in the EU ETS (source: European Commission): within a type of process, EU plants all have nearly the same emission intensity and have barely reduced it over 12 years.

Figure 1 : Free allocation benchmarks and statistical distribution of emissions intensity in the EU ETS (source: European Commission6)

Grey cement clinker – t CO_2e per tonne of product



Hot metal – t CO_2e per tonne of product



6 European Commission (2021), Update of benchmark values for the years 2021 – 2025 of phase 4 of the EU ETS

This system of free allocation creates distortions **between processes covered by the ETS.** For example, steelmaking using blast furnaces can claim more allowances than if using electric arc furnaces. It also creates distortions **between products (covered or not by the ETS)**, as e.g. making Portland cement (which uses 95% grey clinker) gives right to more permits than making low-clinker cement – let alone producing other equivalent construction materials such as bricks, stone or timber products. Distortions created by free allocation trickle **down value chains**, as finished products made from materials that grant more free permits are more competitive, e.g. houses made from concrete rather than from bricks. Free allocation based on output makes circularity less profitable, as it rewards production over savings, which hampers a key pillar of the EU's climate agenda. It also carries some degree of **absurdity**, as the production of intermediary products (such as hydrogen) is rewarded even if they are wasted and don't improve the end product.

2.2.2 Bureaucracy

Free allocation is also a source of unnecessary bureaucracy, as demonstrated by the complexity of its two supporting legislative texts: the Free Allocation Regulation (or 'FAR', which defines the number of permits granted per unit of 54 processes and products) and Activity Level Change Regulation (or 'ALCR', which specifies how to adjust a factory's free allocation based on its level of output). As FA benchmarks are based on the 10% least emitting plants for each of the 54 benchmarks, the **FAR** requires collecting confidential production data from all ETS-covered plants over long periods of time. In a document called National Implementation Measures (NIM), each country submits data on the production activity of their plants, broken down to the level of each process (called **sub-installations**), including data such as transfers of heat and gases, electricity production and emissions over the previous five years. The NIMs then undergo a consistency check and a completeness check by the European Commission, then additional assessments for certain installations. The Commission rejects or accepts the NIMs. This clears the way to **preliminary free allocation**.

This is when the **ALCR** comes into play. Each year, free allocation is adjusted to the activity level of each sub-installation in the previous two years. This requires the transmission of an activity level report by each installation operator to the national authorities. National authorities calculate and submit **adjusted FA** amounts for each installation, which the Commission validates.

Another direct consequence of free allocation is the need to apply **a cross-sectoral correction factor (CSCF)**, which is a multiplier with a value between 0 and 1. Since the number of free allowances is based on a plant's output, there is a risk that their total number would exceed the ETS cap. The CSCF is calculated so as to prevent this from happening by uniformly reducing the number of free allowances allocated to each plant. **Final allocation** is published in **National Allocation Tables (NAT)**. This unpredictable factor creates **uncertainty** for plant operators **over the number of allowances** they will receive and the system's complexity creates risks of litigation. For example, the German companies Borealis Polyfine GmbH and OMV Refining & Marketing GmbH claimed the European Commission did not correctly determine the maximum annual amount of allowances which had led to the CSCF being miscalculated. The Court ruled in favor of the operators and the Commission had to adjust its CSCF value for the upcoming years. This created **legal uncertainty** as the CSCF values in Annex II of the Commission's CSCF decision were no longer applicable and operators had little clarity on how their future FA would be affected.

To make free allocation less favourable to polluters, **conditionality requirements** have been introduced, obliging operators to run energy audits or adopt certified energy management systems, then submit a Climate Neutrality Plan outlining measures to reach climate neutrality by 2050 at installation level, intermediate targets and milestones to measure this progress every five year and include an estimate of the impact of each of the measures. The climate plans then have to be duly reported on, monitored and verified (MRV), then those MRV reports checked by the Commission.

2.2.3 Market distortions

Free allocation is not sustainable in the long run as the emissions cap decreases fast in the ETS. In addition, it is a source of **volatility of carbon market prices**. Firstly, because free allocation **mutes the carbon price signals** that industry should respond to. Having to pay for only a fraction of their emissions, plant operators are less sensitive to variations of allowance prices and are less likely to take emission reduction measures if prices start spiralling up. Unmitigated emissions feed volatility instead of stabilising it.

Moreover, with free allocation, some factories end up with too many allowances for their needs. Plant operators don't always sell these excess allowances to the market, even when prices are high, because of the administrative burden of doing so and the difficulty of making such decision while having uncertain future needs. As a result, **unused emission permits often stay in operators' registries** instead of being sold to meet the demand at times of high prices, failing to curb volatility.

Finally, the yearly adjustment of free allocation is a source of market distortion, because this adjustment only happens if the activity level of a sub-installation changes by more than 15% compared to the 5-year level set by the FAR. Plant operators have an **incentive to reduce their activity** by only 14% and still earn as many free permits. A company owning 3 plants might be able to earn more permits by increasing its production by 15% in one plant and reducing it by only 7.5% in the other two, which is **unfair to smaller companies**.

Replacing free allocation with the CBAM would put an end to this long list of wrong incentives and allow the EU to better follow its decarbonisation agenda.

2.3 Indirect cost compensation: the other carbon leakage measure

In addition to free allocation, the EU ETS has a mechanism to allow Member States to compensate their electricity-intensive plants for the carbon costs associated to their electricity use. As carbon pricing makes electricity more expensive, Member States can compensate large power consumers with an amount of State aid proportional to the extra costs borne. This mechanism is expensive for those Member States that apply such compensation and creates distortions with those that don't. These negative effects are likely to get worse with the expected electrification of EU industry and the rise of carbon prices.

This partial compensation is also a source carbon leakage, as there remains a difference in the costs borne by EU and non-EU producers. Covering indirect emissions (from the use of electricity) under the CBAM would allow to reform the indirect cost compensation system and reduce the risks of carbon leakage.

3. Current status of the CBAM

3.1 Description

3.1.1 Legislative status

The CBAM is ruled by one main legislative text: the CBAM Regulation, published in May 2023. It was previously voted by the Parliament and Council and defines the CBAM's overall structure and main mechanisms but gives mandate to the European Commission to propose secondary legislation to sort out finer details of its implementation. A total of 13 such secondary legislative texts are thus expected, of which only two (see below) have so far been adopted.

The Implementing Regulation on methodologies, published in August 2023, defines how to calculate embedded emissions and reporting obligations during the transitional period, as per article 35(7) of the CBAM Regulation.

It will be replaced by a new Implementing Act (IA) under article 7(7) of the CBAM regulation, defining the rules for the definitive period.

On 18 of December 2024, the Commission published the Implementing Regulation with rules for the CBAM registry. Currently, CBAM data are stored in a *transitional* registry. The CBAM registry will serve as a database for authorised CBAM declarants, applicants to become authorised CBAM declarants, operators, and accredited CBAM verifiers. The CBAM registry consists of four components, the CBAM Declarants Portal (CBAM DP) where importers declare their imported goods, the CBAM National Competent Authorities Portal (CBAM NCA) which is reserved to NCAs, the CBAM European Commission Portal (CBAM COM) which reserved to the Commission's own use, and the CBAM Operators

Portal (CBAM Operator), for overseas manufacturing plant operators. As such, the CBAM registry acts as portal for CBAM declarants to submit CBAM declarations, for CBAM operators to register information on installations, goods, and emissions, which is then available to customs authorities and national competent authorities. The CBAM registry may also support the Commission on analytical tasks for CBAM risk-analysis.

Section 3.2 will describe the remaining steps due to complement the CBAM legislation.

3.1.2 Geographical scope

The CBAM applies to imports originating from all countries outside the EU, with two exceptions:[7]

1. Extra-EU countries covered by the EU ETS (i.e. Norway, Iceland and Liechtenstein)
2. Extra-EU countries with a cap-and-trade scheme twinned with the EU ETS (i.e. Switzerland)

3.1.3 Implementation timeline

From 1 October 2023 until 31 December 2025, CBAM obligations are limited to monitoring and reporting.

During this transitional phase, the Commission is finalising its implementing legislation while gathering information on embedded emissions. Starting from 1 January 2026, the CBAM will become fully effective, requiring from importers to surrender CBAM certificates based on emissions of goods imported in the previous calendar year. So, declarants will only start surrendering certificates in 2027.

3.1.4 Number of CBAM certificates

The introduction in 2026 of financial obligations under the CBAM comes together with the reduction of free allocation under the EU ETS. The *phase-in* of the CBAM charge and the *phase-out* of free allocation will happen simultaneously between 2026 and 2034.

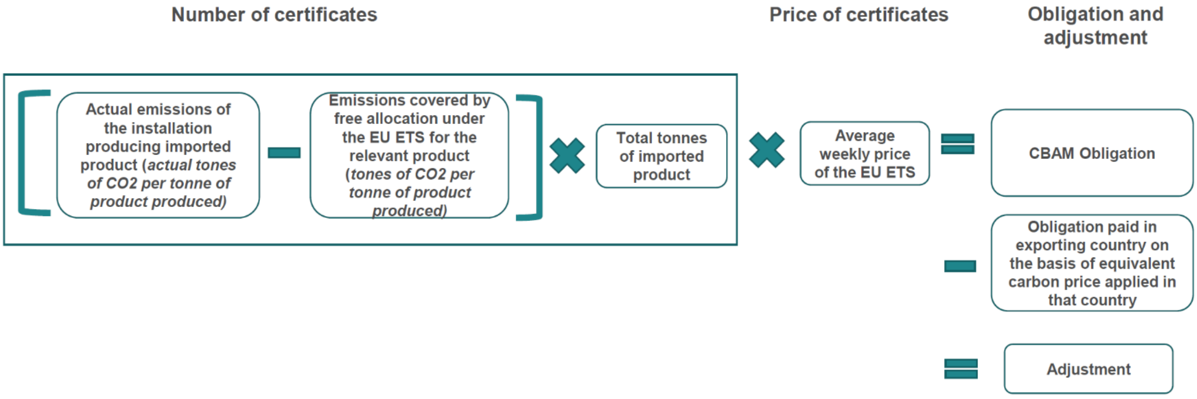
The CBAM calculation formula is shown in Figure 2 : Value of CBAM financial obligations as free allocations are being phased out2. The number of CBAM certificates to be surrendered will correspond to the emissions embedded in the goods, reduced by the amount of free allowances that equivalent products covered by the EU ETS receive. As free allocation is gradually reduced in amounts shown by Figure 2 : Value of CBAM financial obligations as free allocations are being phased out3, the number of CBAM certificates to surrender will increase until they cover the entire share of embedded emissions by 2034, when EU-based plants making similar products will no longer receive free allowances.

The number of CBAM certificates required will also be reduced by the carbon

7 Article 2(6) of the CBAM Regulation

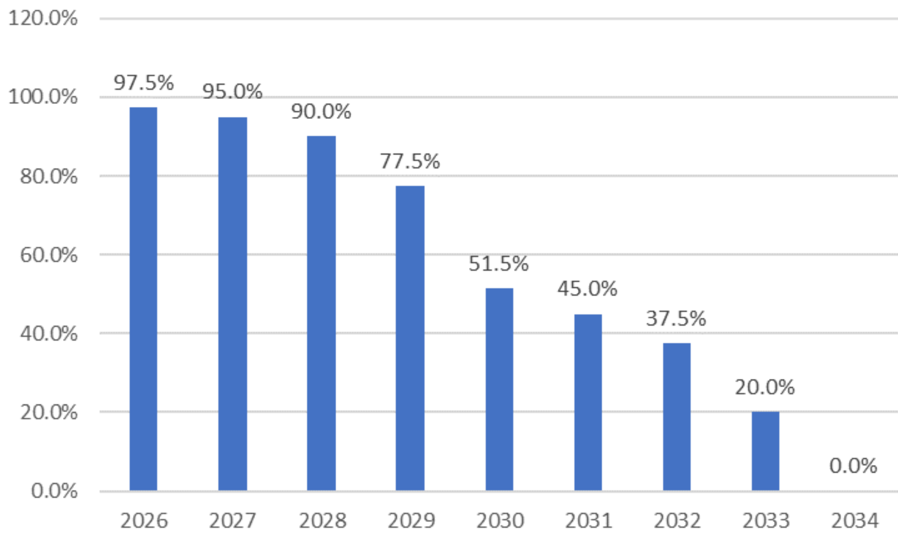
price paid (if any) in their country of origin.[8]

Figure 2 : Value of CBAM financial obligations as free allocations are being phased out



Source: European Commission[9]

Figure 3 : Discount from CBAM certificates as proportion of free emission permits in the EU ETS



Source: European Commission[10]

3.1.5 Scope

This section describes the scope of the CBAM, both in terms of the goods it covers and the sources of emissions for each of these goods.

3.1.5.1. Goods covered

The goods covered by the CBAM are summarised in Table 1. It should be noted that goods intended for military purposes, as well as those imported

8 Article 9 of the CBAM Regulation

9 European Commission (2023), 3nd Meeting of the Informal Expert Group on the analytical methods for the monitoring, reporting, quantification and verification of embedded emissions in goods under the scope of CBAM

10 Sandbag's own chart from rules stipulated by the CBAM Regulation

in consignments valued below €150 will be exempted from the levy.[11] This latter exemption is about to be extended, as part of the 'Omnibus' package, proposed by the Commission in February 2025 and provisionally agreed by Parliament and Council in June. The Omnibus amendment will raise the threshold to 50 tonnes of net mass of imported CBAM goods per year and per importer, thereby exempting 80% of businesses from the CBAM, according to the Commission.

Table 1. Goods covered by the CBAM

Product category	Products
Aluminium	Unwrought aluminium, aluminium powders and flakes, and all kinds of aluminium products (including bars, rods, wires, plates, sheets, foils, tubes and pipes, tube and pipe fittings, structures, reservoirs, tanks, casks, drums, cans, boxes, other containers, and cables)
Chemicals	Hydrogen
Cement	Cement clinkers, white Portland cements, other Portland cements, aluminous cements, other hydraulic cements, other kaolinic clays
Electricity	Electrical energy
Fertilisers	Nitric acid, sulphonitric acids, urea, ammonia (anhydrous or in aqueous solutions), nitrates of potassium, mixed fertilisers (nitrogenous mineral and chemical fertilisers, and other fertilisers containing nitrogen, phosphorus and/or potassium)
Iron and Steel	Agglomerated iron ores and concentrates (other than roasted iron pyrites), pig iron, ferrous products obtained by DRI and other spongy ferrous products, crude steel, and all kinds of iron and steel products* (including bars, rods, rails, wires, tubes, pipes, sheets and other flat-rolled products, reservoirs, tanks, casks, drums, cans, boxes, containers, as well as screws, bolts, nuts, hooks, and rivets) – *except certain ferro-alloys (only ferro-manganese, ferro-chromium, and ferro-nickel are covered), and ferrous waste and scrap (including remelting scrap ingots and steel)

Source: Sandbag, summarised from European Commission (Annex I of the CBAM Regulation (EU) 2023/956)

3.1.5.2. Emissions covered

As per its stated goal of levelling the playing field between EU and non-EU producers, the CBAM covers the same greenhouse gas emissions as the EU ETS: carbon dioxide (CO_2), nitrous oxide (N_2O) and perfluorocarbons (PFCs). However, whereas the EU ETS charges industrial and electrical plants separately for the GHG emitted by those respective plants, it is necessary for the CBAM to consider emissions from the electricity used to manufacture imported goods as "embedded" together with the imported goods, to count them in.

3.1.6 Direct vs. indirect emissions

"Direct" emissions (in the sense of the CBAM) refer to "scope 1" emissions, i.e. that are released into the atmosphere from on-site activities. Indirect

11 Article 2(3) of the CBAM Regulation

emissions are GHG emissions that occur off-site **due to the consumption of electricity**, often called "scope 2". Heating and cooling provided from external sources are considered as direct emissions.

Reporting obligations cover both direct and indirect emissions for all sectors. However, only imports of cement, fertilisers and agglomerated ore must pay for both direct and indirect emissions after the transitional period, while for all other CBAM goods, the levy will apply only to direct emissions.

Table 2:
Financial obligations for direct and indirect emissions as of 2026

	Direct	Indirect
Aluminium	✓	
Cement	✓	✓
Electricity	✓	
Fertilisers	✓	✓
Iron and Steel	✓	Only agglomerated ore
Hydrogen	✓	

Source: Sandbag, summarised from the CBAM regulation

Emissions from precursors (upstream products)

The CBAM also covers GHG emitted in the manufacturing of some of the products used as inputs in the manufacturing of CBAM-covered goods, on the condition that those goods are also covered by the CBAM (*relevant* precursors). For example (see Figure 4), embedded emissions of steel products also cover sintered ore (which is covered by the CBAM) but not coke and lime (which are not).

There are a few exceptions to this rule, as for example, although both steel and aluminium are covered by the CBAM, aluminium used as alloy in steel products is not considered a relevant precursor. Table 3 below summarises products and their precursors and whether they are covered by the CBAM or not.

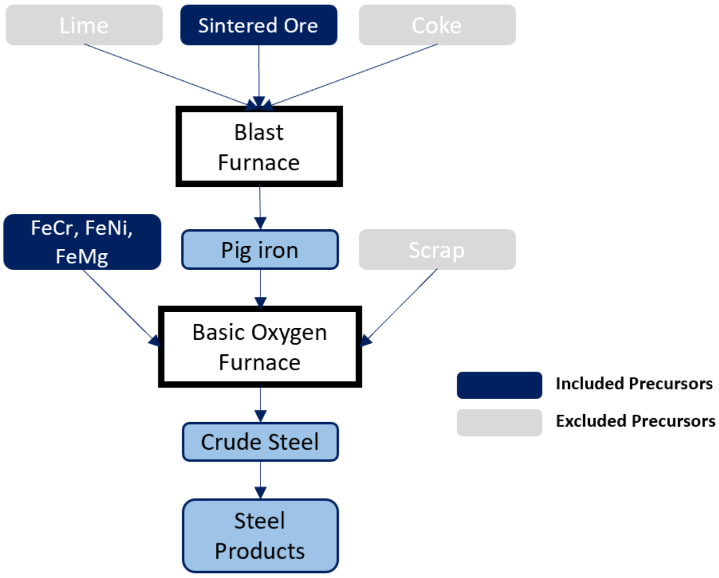
Table 3. Coverage of precursors

CBAM-covered product	Covered by CBAM, receiving free EU ETS allowances	Not covered by CBAM, receiving free EU ETS allowances
Steel (BF-BOF12)	Hot metal, sintered ore, ferro-nickel, ferro-manganese, ferro-chromium	Coke, lime, all other ferro-alloys, aluminium as steel alloy
Steel (EAF13)	Direct reduced iron, hydrogen, ferro-nickel, ferro-manganese, ferro-chromium	Lime, other ferro-alloys
Aluminium	Aluminium	Alumina, pre-bake anode
Fertilisers	Ammonia, nitric acid, hydrogen	
Cement and clinker	Grey and white clinker, calcined clay	Alumina

Source: Sandbag, summarised from the CBAM regulation

12 Made through the production route based on blast furnace and basic oxygen furnace
13 Made using electric arc furnaces

Figure 4: Relevant vs. non-relevant precursors for Steel products



Source: Sandbag, from information in the Delegated Act on emissions reporting under Art 35(7) of the CBAM Regulation

3.1.6.1. 'Actual' vs. 'default' values

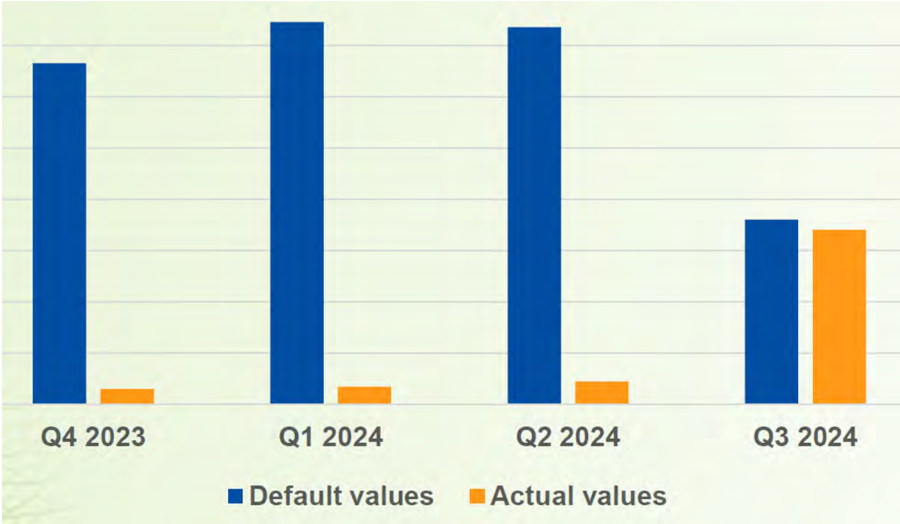
Declarants need to report the embedded emissions of their imported goods. This can be done either by calculating the emission intensity of each product (actual data), or by simply taking emission intensity figures from a list of default values given by the Commission. Default values are emission intensity factors that can be used without measuring emissions data at plant level, so they are much simpler to use. However, declarants are rather pressed to provide their own actual data. During the transitional period (see 3.2.1), default values cannot cover more than 20% of goods emissions, except for indirect emissions (from electricity use) and last recourse situations where actual emissions "cannot be adequately determined" by the declarant. This means cases where:

- "for a specific data set there is no monitoring method, or
- it would incur unreasonable costs or is technically not feasible", or
- "monitoring methods from another eligible monitoring, reporting and verification system" (…) are not available, not technically feasible, or would incur unreasonable costs", in which case indirect methods for determination of the data set (…) may be used."
- "Where such methods are not available, not technically feasible, or would incur unreasonable costs, default values may be used". [14]

The 20% limit only applied starting in Q3 2024. Despite this limit, over 50% emissions were still reported using default values after that date, as shown by Figure 5 : Use of actual vs. default values in CBAM declarations.

14 Annex III A.3 of the Implementing Regulation on reporting methodologies

Figure 5 : Use of actual vs. default values in CBAM declarations



Source: European Commission[15] (the original document was provided without unit)

In the definitive period starting 2026, the current 20% cap on the use of default values under CBAM will be lifted. However, such use will be discouraged by the relatively high level of those values. Default values will be based on the average emission intensity of each exporting country for all goods except for electricity (as a good), and will be **increased by proportionate mark-ups** to uphold the CBAM's environmental integrity. The Commission will determine and periodically adjust these default values based on reliable and publicly accessible information. If reliable data is unavailable, default values will be based on the average emission intensity of a yet-to-be-defined percentage of the **worst-performing installations** covered by the EU ETS for that particular type of good[16].

3.1.7 Obligations for CBAM declarants

There has been considerable discussion about how burdensome and bureaucratic CBAM obligations are for declarants. This section tries to give a fair account of the scheme's administrative burden in practical terms.

3.1.7.1. Registration

Initially, customs authorities inform importers of their CBAM reporting duties. Declarants are either importers or their appointed customs representatives in the case of importers not located in the EU. Initially, customs authorities inform declarants of their CBAM reporting duties. Importers then retrieve credentials from a National Competent Authority (NCA) to connect to the Transitional CBAM Registry (from 2026: the CBAM Registry). There are currently no specific criteria to be granted access, but from 2026, only Authorised Declarants will be able to, after being granted this status by their NCA on the basis of a due diligence.

15 November 2024, 2nd Meeting of the informal Expert Group on the carbon border adjustment mechanism (CBAM)

16 Annex IV 4 of the CBAM Regulation

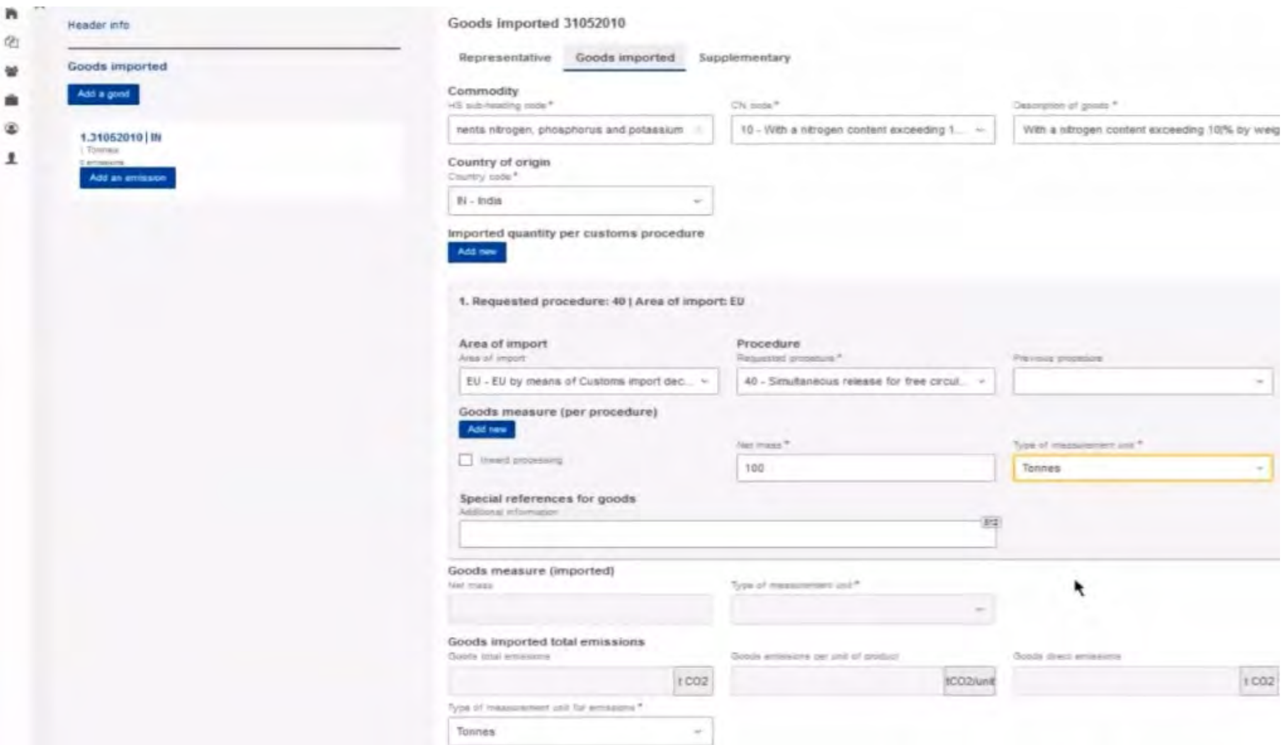
3.1.7.2. Reporting

Reporting obligations for the definitive period (starting in 2026) will be set out at a later stage (see 3.2.1). In the meantime, they are governed by specific rules for the Transitional Period. The requirements include information on declarants, imported goods, their origin, embedded emissions (direct and indirect) and the carbon price paid in the country of origin.

In the Transitional CBAM Registry (see Figure 6 : Screenshot of the CBAM Transitional Registry6), declarants must fill in the following:

- Information on the importer, operators and installations referred to in quarterly reports, and
- Quarterly reports listing the goods, their quantities, emissions, and the price paid in the country of origin.

Figure 6 : Screenshot of the CBAM Transitional Registry



The amount of information required is the same regardless of the quantity of goods imported. There is a threshold of only €150 of value per consignment, so the burden may seem disproportionate when the resulting CBAM fee is only a few euros. However, the European Commission has recently proposed to raise this threshold and change it to a mass-based threshold, the value of which shall ensure that at least 99% of the embedded emissions of the total amount of imported goods are covered. For 2026 the proposed threshold is 50 tonnes, which exempts 80% of businesses from CBAM obligations compared to the current situation[17]

17 European Commission. (2025) Proposal for a Regulation of the European Parliament and of the Council amending Regulation (EU) 2023/965 as regards simplyifying and strenghening the carbon border adjustment mechanism

3.1.7.3. Embedded emissions: quite simple with the mass balance method

Direct embedded emissions can be monitored either through a calculation-based or measurement-based methodology[18]. The latter involves the continuous measurement of the concentration of relevant greenhouse gases in flue gases, using measuring equipment. In contrast, calculation-based methodologies do not require any equipment and is fairly straightforward, as illustrated in Table 4 : Method recommended for the reporting of emissions from a blast furnace.

Table 4 : Method recommended for the reporting of emissions from a blast furnace

#	Method	Source stream name	Activity data (AD)	AD Unit	Net calorific value (NCV)	NCV Unit	Emission factor (EF)	EF Unit	Carbon content	C-Content Unit
Ex.1	Combustion	Heavy fuel oil	252,000.00	t	45.00	GJ/t	73.00	tCO2/TJ		
Ex.2	Process Emissions	Raw meal for clinker	121,000.00	t		GJ/t	0.09	tCO2/t		
Ex.3	Mass balance	Steel	-1,808,226.00	t		GJ/t			0.00388	tC/t
1	Mass Balance	Coke fines	50,000.00	t	28.20	GJ/t			0.8800	tC/t
2	Mass Balance	Iron ores	5,600,000.00	t		GJ/t			0.0002	tC/t
3	Mass Balance	Coke	2,200,000.00	t	28.20	GJ/t			0.8800	tC/t
4	Mass Balance	Plastic wastes	70,000.00	t	38.00	GJ/t			0.6836	tC/t
5	Mass Balance	Scrap (external)	800,000.00	t		GJ/t			0.0021	tC/t
6	Mass Balance	Scrap (internal)	200,000.00	t		GJ/t			0.0018	tC/t
7	Mass Balance	Lime calcined	280,000.00	t		GJ/t			0.0027	tC/t
8	Mass Balance	Natural gas	170,000.00	t	48.00	GJ/t			0.7500	tC/t
9	Mass Balance	Other inputs	40,000.00	t		GJ/t			0.1000	tC/t
10	Mass Balance	Steel	-4,800,000.00	t		GJ/t			0.0018	tC/t
11	Mass Balance	Slags	-1,000,000.00	t		GJ/t			0.0003	tC/t

Source: CBAM portal of the European Commission

3.1.7.4. Purchase of certificates

From 2026 onwards, importers will be required to ensure that the number of CBAM certificates held in their account is equivalent to 80% of the emissions embedded in the goods they have imported since the start of the year. However, as part of the 'Omnibus' amendment, a) the minimum provision of certificates will be reduced down to 50% and b) the application of that minimum provision rule will be delayed to February 2027. This delay is understandable, as parts of the CBAM implementing regulation, including on the discount applicable to CBAM fees for emissions already paid in countries of origin, might not be ready by the end of 2025. In addition, the date for which all CBAM certificates are to be surrendered should be delayed from 31 May 2027 to 31 August 2027, for the year 2026

From that time, certificates can be purchased from National Competent Authorities at any time at a price equal to the weekly average auction price of European Union Allowances (EUAs) and expressed in euros per tonne of CO_2 emitted.[19] Declarants will also be able to sell back unused certificates to their NCA.

3.1.7.5. Incompliance

During the Transitional Period, the IA under Article 35(7) sets the rules for applying penalties in case of failure to report or failure to correct incorrect or incomplete reports[20]. This penalty is between €10-50 per tonne of unreported CO2 equivalent emissions. However, for the definitive period

18 Annex III B.2 of the Implementation Act on reporting obligations during the transitional period

19 Article 36 of the CBAM Regulation

20 Article 16 Commission Implementing Regulation (EU) 2023/1773

starting 2026 different rules apply. In the definitive period, penalties apply if the number of CBAM certificates surrendered do not correspond to the emissions embedded in the goods imported during the preceding calendar year (deadline 31st of May each year for the preceding year)[21]. In that case, the CBAM carries the same penalty as the EU ETS, which is €100 per tonne of unreported CO2 equivalent emissions in addition to the outstanding number of CBAM certificates of concern for the violation. Additionally, if a person other than an authorised CBAM declarant imports goods into the customs territory of the Union without complying with the CBAM Regulation, a penalty three to five times the previously mentioned penalty shall be applied corresponding to the severity of the infringement.

3.2 Remaining legislative process until the end of 2025

As mentioned in 3.1.1, the CBAM Regulation requires the Commission to draft 13 secondary legislative texts (called *Delegated Acts* (DA) or *Implementing Acts* (IA)), of which only two have been adopted so far. Of the remaining 11, we have identified four which are often cited with some anxiety by stakeholders: the first three could directly impact the amount of fees paid by importers, and the last one will impact the nationality of entities allowed to handle confidential data. Annex I gives the full list and official calendar of all forthcoming texts.

3.2.1 IA on Calculation of embedded emissions – Article 7(7)

This IA will set the rules for calculating the embedded emissions of CBAM goods during the definitive period, replacing those in force during the transitional period. It will impact financial obligations because the number of CBAM certificates declarants have to purchase is directly linked to embedded emissions. Key elements of the IA will include how to report the **emissions embedded in metal scrap**. Currently considered as emissions-free, metal scrap is currently the main enabler of 'resource shuffling' for steel and aluminium imports, a strategy for minimising CBAM costs later discussed in this report.

Another key element will be the extent to which actual data or **default values** can or must be used as emission intensity in the reporting (see section 3.1.6.1 for more details on default values). The ability to report actual data also allows for resource shuffling, whereas the use of default values simplifies the reporting process. Finally, the way default values applicable to each product and country are set will also have an impact on resulting CBAM fees.

Resource shuffling

> Resource shuffling was described by the European Commission's impact assessment accompanying its CBAM regulation proposal[22], as the allocation or attribution of less emissions-intensive materials production (including materials embedded in manufactured goods) towards markets with higher carbon costs, while **the overall carbon**

21 Article 6 of the CBAM Regulation

22 European Commission (2021), Impact Assessment Report accompanying the document: Proposal for a regulation of the European Parliament and of the Council establishing a carbon border adjustment mechanism

intensity of production in the home market remains constant. According to the document, there exist several mechanisms through which resource shuffling can take place, including “attribution of shares of **recycled material** to imported or exported goods”.

Since resource shuffling does not create any climate benefit, the EU might consider it as circumvention and, although it does not violate the CBAM regulation or its implementing legislation, try and reduce opportunities for such practice, by amending the legislation.

3.2.2 IA on free allocation of allowances under the EU ETS and obligation to surrender CBAM certificates – Article 31(2)

This IA will determine the deduction applied to the CBAM charge because of emission allowances being given for free to EU plants covered by the EU ETS, as illustrated by the formula in Figure 2 : Value of CBAM financial obligations as free allocations are being phased out This deduction therefore impacts financial obligations..

A key point here is that the EU ETS grants free emission permits to factories (which may not produce finished goods) whereas the CBAM will charge finished goods, and EU manufacturing processes are sometimes different from overseas. So for example, DRI (direct reduced iron) manufacturing earns a lot of free allowances in Europe, but European long steel mills typically do not use any DRI so they receive few free allowances. In contrast, CBAM fees on imported long steel made from DRI could be massively discounted, possibly down to zero, if the discount applied strictly mirrored the EU ETS allocation regime.

Another way of calculating the discount is by applying a product-based set of free-allocation benchmarks. A communication from the Communication in December 2024 suggests that it might go down that route. The Commission ran a survey with selected stakeholders but haven’t published any results, so at this stage things are still unclear.

3.2.3 IA on Carbon price paid in third countries – Article 9(4)

The CBAM fee calculation formula, as shown in Figure 2 : Value of CBAM financial obligations as free allocations are being phased out, includes a deduction based on the carbon price paid in the country of origin of the goods. This other deduction also impacts financial obligations.

Carbon pricing schemes set up in third party countries could lead to reducing or even exempting the products exported by local companies from CBAM fees. However, since the deduction is justified by the need for a level-playing field between third countries and the EU, other forms of subsidies received by those producers would tend to cancel out the effect of the carbon price. Whether and how the EU would account for subsidies in the deduction applied to the CBAM is a question.

3.2.4 DA on accreditation of verifiers – Article 18(1)

The EU will set criteria according to which independent organisations can be entrusted to "verify" the emissions reports created by manufacturing plants in third countries. So far, the Commission has not said whether non-EU companies would be eligible to such accreditation. In some countries, this is perceived as a sovereignty issue, as verifiers would typically be entitled to visit production sites and check the numbers reported by plant operators against their own observations.

4. How might the CBAM evolve?

The previous section gave a picture of the CBAM as it stands today. However, on many aspects, this legislation is considered as only a first step towards a more comprehensive mechanism. Firstly because the products it covers represent only a fraction of the emissions covered by the EU ETS, but also because a number of important questions have been left aside by the current legislation by means of simplification and are likely to resurface in the future. From the current situation, a number of evolutions are therefore possible, some of which are already hinted in the current legislation while others have been proposed by various stakeholders including the European Commission itself. This section tries to assess the scope and likelihood of possible changes.

4.1 What's in the legislation?

The biggest possible changes to the CBAM Regulation are already written in the current text. According to Article 30, before the end of 2025, the Commission shall present a report to Parliament and Council assessing the possibility to extend the CBAM scope to:

(i) **indirect emissions** of CBAM goods resulting from the use of electricity in manufacturing processes;

(ii) embedded emissions in the **transport** of the goods listed in **Annex I and transport services**;

(iii) goods at risk of carbon leakage, and specifically **organic chemicals and polymers**;

(iv) other input materials (**precursors**) for the goods listed in Annex I

According to Recital 35 of the CBAM regulation, some "technical constraints apply to **refinery products**, for which it is not possible to unambiguously assign greenhouse gas emissions to individual output products. At the same time, the relevant benchmark in the EU ETS does not directly relate to specific products, such as petrol, diesel or kerosene, but to all refinery output."

Similar wording is used for **organic chemicals** in recital 34, but these are nevertheless considered as scope extension under article 30(2). Recital 34 says that organic chemicals should not be included due to "technical limitations" to the attribution of embedded emissions at the time of the text's adoption, and that more data and analysis are required for more precise attributions.

According to Article 30(3), by the end of 2024, the Commission was supposed to present a report to the Parliament and Council that identifies products further **down the value chain of the goods covered by the CBAM** that it recommends to be covered. The release of this report is now postponed to the end of 2025.

According to Article 27 of the Regulation, where the Commission has sufficient reasons to believe that circumvention is occurring in one or more Member States by way of an established pattern, it can amend the list of goods covered by the CBAM by adding the relevant slightly modified products, for **anti-circumvention purposes**.

The competitive distortion introduced by the end of free allocation for **exporting EU plants** has been left unaddressed by the current legislation, except for Recital 47 of the ETS Directive which mentions (without giving explicit figures) that Member States should use revenues to address any residual risk of carbon leakage in CBAM sectors.

Pursuant to Article 30(5) of the CBAM regulation, every two years starting in 2028, as part of its EU ETS review, the Commission shall assess the effectiveness of the CBAM in addressing the carbon leakage risk of goods produced in the Union for export to third countries which do not apply the EU ETS or a similar carbon pricing mechanism. In addition, another review pursuant to Article 30(6ai) shall include an assessment of carbon leakage, including in relation to exports, before 2028. Where the report concludes that there is a risk of carbon leakage of goods produced in the Union for export to such third countries, the Commission shall, where appropriate, present a legislative proposal to address that risk. This review is now ongoing, and a public consultation is open until **26 August 2025**[23].

Before the start of 2028, and every two years thereafter, Article 30(6) commands that the Commission shall present a **general report** to the Parliament and Council on the application of the CBAM and its impacts. This article does not prescribe particular changes to the scheme, but it could create a political trigger for some.

4.2 Assessing the likelihood of future CBAM evolution

Section 4.1 listed a number of reviews scheduled at set dates. However, various communications by the European Commission indicate that this calendar will be changed. For example, a communication was published on 2 July 2025 on the treatment of EU exports (initially due by 2027), and a review is expected for Q4 2025, covering downstream extensions (initially due in Q4 2024) and anti-circumvention.

23 European Commission, public consultation portal

4.2.1 Other input materials (precursors) for the goods listed in Annex I

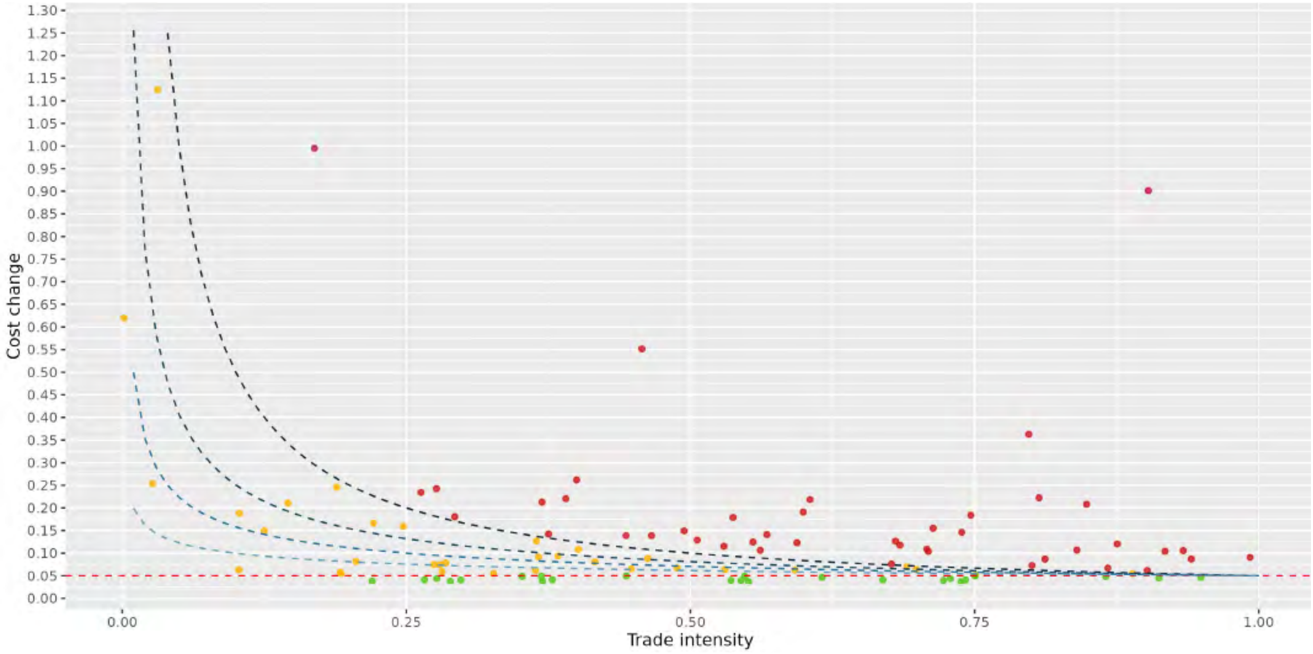
As mentioned in 3.1.5, some upstream products (precursors) of CBAM goods are currently excluded from the scope of emission reporting. Although discussions around this topic have been scarce so far, candidates include ferro-silicon, lime and coke (for steel products), pre-bake anode and alumina (for aluminium products). Those products, whose manufacturing is still awarded free allowances under the EU ETS, would therefore have to be added to the list of CBAM-covered goods, which will only happen at a later stage.

Embedded emissions from steel and aluminium scrap in the reporting of emissions from steel and aluminium products might be added as well. For those emissions to be covered, it is not clear whether scrap itself will need to be added to the list CBAM-covered goods. If not, those emissions could be added as early as 2026.

4.2.2 Products further down the value chain

As mentioned in 4.1.3, a report on possible CBAM extensions to downstream products is overdue, so we can only summarise exchanges from stakeholders on this topic. First, a chart shared by European Commission's DG TAXUD in November 2024 measured the risk of exposure to carbon leakage as a combination of cost increase x trade intensity. Although the chart is only presented as a cloud of points, 42 "red dots" appear as products with combined exposures higher than 5%.

Figure 7: Risk of exposure to carbon leakage as a combination of cost increase and trade intensity



Source: European Commission[24] (vertical axis is a multiplication factor; horizontal axis is the share of a goods' traded volumes compared to domestic demand)

24 European Commission (2024), 2nd Meeting of the informal Expert Group on the CBAM

In political discussions, some stakeholders have warned about the complexity of extending the CBAM to downstream products, which could outweigh the benefits of the inclusion. This concerns, in particular, goods made of a combination of CBAM and non-CBAM products. Conversely, some stakeholders have been vocal about the risks of not including some goods, in particular vehicle parts and cutlery (this latter type having been specifically mentioned at an event by the head of the section in charge of the CBAM at the European Commission). In a joint declaration of Belgium, Italy, France, Luxembourg, Romania, Slovakia, and Spain, the countries have argued the need for further risk assessment regarding carbon leakage for downstream products[25].

4.2.3 Organic chemicals, polymers and refinery products

The inclusion of organic chemicals, polymers and refinery products into the CBAM remains uncertain due to the complexity of chemical value chains, difficulty of determining the embedded emissions of such imported goods and the associated possibility for circumvention. However, studies have highlighted the potential benefits associated with their inclusion in preventing carbon leakage.[26] Basic organic chemicals, including steam cracking products, are perhaps most likely to be included as the most imported chemicals and as the chemicals responsible for most emissions in the EU. However, only including these basic chemicals would create indirect carbon leakage risks for downstream products, with circumvention likely. Therefore, there is value in including key downstream polymers and upstream refinery products, although this could take place slightly later (i.e. possibly soon after 2030 rather than before). For further discussion of these considerations see Section 5.3.4.

4.2.4 Indirect emissions

There has been resistance from Member States to the inclusion of indirect emissions into the CBAM for goods other than cement and fertilisers. For example, in February 2025 France stated that it was against their early inclusion. In a joint declaration of Belgium, Italy, France, Luxembourg, Romania, Slovakia, and Spain, the countries noted that further in-depth sectoral analysis should be carried out before an extension to indirect emissions could be considered, especially noting that an inclusion will have to be consistent with the indirect cost compensation scheme. However, we believe that there could be an agreement, at least with France, if the inclusion of indirect emissions under the CBAM could replace indirect cost compensation without loss of competitiveness for EU companies.

The inclusion of indirect emissions and possibly emissions from transportation are likely to be proposed at a later stage, i.e. after 2030, due to time constraints and the other listed topics being more politically important.

25 Ministère de l'économie des finances et de la souveraineté industrielle et numérique. (2025). Joint declaration of Belgium, Italy, France, Luxembourg, Romania, Slovakia and Spain on an action plan for the European Steel Industry.

26 Trinomics, (2022), Study on the inclusion of the chemical sector in CBAM

4.2.5 Governance and administrative costs

The report due in 2025 under Article 30(2) includes other assessments, including an assessment of the governance system and administrative costs. However, the Commission did not wait for that report to propose an 'Omnibus' simplification amendment (in February 2025, then provisionally agreed by the Parliament and Council in June). Changes to the Regulation include:

- An increase of the exemption threshold from €150 per consignment to 50 metric tonnes of imported goods per year and per importer (exempting 80% of businesses while still covering 99% of imported GHG emissions). The threshold may be changed in the future to still ensure 99% emission coverage.[27]
- A decrease in number of certificates that importers will have to hold in their account, from 80% to 50% of the emissions embedded in the goods they have imported since the start of the year.
- The postponement of the above obligation, from Q1 2026 to February 2027. In addition, the date at which all CBAM certificates covering the year 2026 are to be surrendered will be delayed from 31 May 2027 to 31 August 2027.

Formal adoption of the Omnibus amendment is expected for September 2025.

4.2.6 Exports

Industry has raised strong concerns about the competitiveness of European exports on the international market. As such, there is political inclination for so-called export rebates. This problem was well known at the time of voting the initial regulation. Proposals of such rebates with compatibility with WTO principles were circulated. However, we heard that some of the largest exporting Member States were reluctant to apply such measures by fear of pre-emptive retaliation (before final WTO ruling) by large third countries.

The international landscape has dramatically changed since that time. The EU has been hit by US border tariffs and has less to lose in the Chinese market, where it has already lost some ground. In addition, EU steel and aluminium producers are hit by increased competition from third countries not reaching the US market. We heard privately that some Member States believe a qualified majority can be reached to go ahead with CBAM export rebates.

It should be noted that solutions to issues on exports would not affect the coverage of imports by the CBAM.

4.2.7 Carbon price paid through Article 6 of Paris Agreement

Additionally, other developments in climate policy such as voluntary carbon markets under Article 6 of the Paris Agreement have sparked a dialogue

27 'Omnibus I - COM(2025)87' and 'Omnibus I - COM(2025)87 – annexes' at [here]

on compatibility between the two instruments. Article 6 allows countries to comply with their emission reduction obligations under the Paris Agreement through the use of offset credits issued as a result of project activities.

As importers can deduct from CBAM fees the carbon costs paid in the country of origin of the goods, the costs associated with the purchase of Article 6 credits might be eligible to such discount. In December 2024, a senior official at the European Commission's Directorate in charge of the CBAM (the Commission department in charge of the CBAM) was quoted saying that the European Commission was "carefully considering whether to recognise international credits and deduct them from the CBAM fees"[28].

Companies sometimes use international credits on a voluntary basis as offsets in their corporate emissions reporting. However, that official seemed to rule out the recognition of such voluntary use of carbon credits by the CBAM, tying it instead to the existence of a carbon pricing scheme in the country of origin which itself would allow international credits. The relatively lower prices paid to acquire carbon credits (compared to CBAM certificates) would not compromise the integrity of the CBAM, as 1 tonne of CO2 offset in the country of origin would not be recognised as 1 tonne under the EU ETS but only the acquisition cost would be deducted.

5. Scenarios and methodology

The impact of the CBAM will depend on assumptions made over the policy's coverage (products, emissions) and reactions by EU trade partners. This section describes the set of assumptions regarding scope and strategies adopted in reaction to the CBAM, for which we will show all results in section 6.

5.1 Scope of emissions considered

Given the many possible evolutions of the CBAM, we created five possible scopes of emissions covered by the scheme, broadly reflecting the possible scope extensions listed in section 4 alongside a status quo with the current scope: extension to upstream products of the ones covered by the current scope (precursors); to downstream products; to indirect emissions (from electricity use); and to new products.

We called ***current scope*** the CBAM's coverage as it is described in 3.1.

For the ***extension to precursors***, we assumed an extension of the CBAM to ferro-silicon, lime and coke (for steel products), pre-bake anode and alumina (for aluminium products). We did not consider emissions embedded in steel and aluminium scrap as precursor of steel and aluminium products.

We based the ***extension down value chains*** on 16 selected products of two types of goods (vehicles parts and cutlery) made from CBAM products only, listed in Table 5. List of vehicle parts and accessories linked to downstream

28 Carbon Pulse (2024) EU weighs touchy question of whether to count international carbon credits towards CBAM

goods and Table 6. These product types are identified by CN-8 codes, which refer to the 8-digit level of the Combined Nomenclature (CN), a nomenclature created and used by the European Union for the classification of goods in trade. The CN serves as the EU's nomenclature for common customs tariff and trade statistics.

Table 5. List of vehicle parts and accessories linked to downstream goods

CN8 Code	Description
87084091	Parts for gear boxes of closed-die forged steel, for tractors, motor vehicles for the transport of ten or more persons, motor cars and other motor vehicles principally designed for the transport of persons, motor vehicles for the transport of goods and special purpose motor vehicles, n.e.s (excl. those for the industrial assembly of certain motor vehicles of subheading 8708.40.20)
87086091	Non-driving axles and parts thereof, of closed-die forged steel, for tractors, motor vehicles for the transport of ten or more persons, motor cars and other motor vehicles principally designed for the transport of persons, motor vehicles for the transport of goods and special purpose motor vehicles, n.e.s. (excl. those for the industrial assembly of certain motor vehicles of subheading 8708.60.10)
87087091	Wheel centres in star form, cast in one piece, of iron or steel, for tractors, motor vehicles for the transport of ten or more persons, motor cars and other motor vehicles principally designed for the transport of persons, motor vehicles for the transport of goods and special purpose motor vehicles (excl. those for the industrial assembly of certain motor vehicles of subheading 8708.70.10)
87088091	Suspension systems and parts thereof, of closed-die forged steel, for tractors, motor vehicles for the transport of ten or more persons, motor cars and other motor vehicles principally designed for the transport of persons, motor vehicles for the transport of goods and special purpose motor vehicles, n.e.s. (excl. those for the industrial assembly of certain motor vehicles of subheading 8708.80.20, shock-absorbers, anti roll bars and torsion bars)
87089191	Parts for radiators, of closed-die forged steel, for tractors, motor vehicles for the transport of ten or more persons, motor cars and other motor vehicles principally designed for the transport of persons, motor vehicles for the transport of goods and special purpose motor vehicles, n.e.s. (excl. those for the industrial assembly of certain motor vehicles of subheading 8708.91.20)
87089291	Parts for silencers "mufflers" and exhaust pipes, of closed-die forged steel, for tractors, motor vehicles for the transport of ten or more persons, motor cars and other motor vehicles principally designed for the transport of persons, motor vehicles for the transport of goods and special purpose motor vehicles, n.e.s. (excl. those for the industrial assembly of certain motor vehicles of subheading 8708.92.20)
87089491	Parts for steering wheels, steering columns and steering boxes, of closed-die forged steel, for tractors, motor vehicles for the transport of ten or more persons, motor cars and other motor vehicles principally designed for the transport of persons, motor vehicles for the transport of goods and special purpose motor vehicles, n.e.s. (excl. those for the industrial assembly of certain motor vehicles of subheading 8708.94.20)
87089591	Safety airbags with inflator system and parts thereof, of closed-die forged steel, for tractors, motor vehicles for the transport of ten or more persons, motor cars and other motor vehicles principally designed for the transport of persons, motor vehicles for the transport of goods and special purpose motor vehicles, n.e.s. (excl. those for the industrial assembly of certain motor vehicles of subheading 8708.95.10)

CN8 Code	Description
87089991	Parts and accessories of closed-die forged steel for tractors, motor vehicles for the transport of ten or more persons, motor cars and other motor vehicles principally designed for the transport of persons, motor vehicles for the transport of goods and special purpose motor vehicles, n.e.s. (excl. those for the industrial assembly of certain motor vehicles of subheading no 8708.99-10)
87089992	Parts and accessories for tractors, motor vehicles for the transport of ten or more persons, motor cars and other motor vehicles principally designed for the transport of persons, motor vehicles for the transport of goods and special purpose motor vehicles, of closed-die forged steel, n.e.s. (excl. those for the industrial assembly of certain motor vehicles of subheading 8708.99.19)
87089993	Parts and accessories of closed-die forged steel, for tractors, motor vehicles for the transport of ten or more persons, motor cars and other motor vehicles principally designed for the transport of persons, motor vehicles for the transport of goods and special purpose motor vehicles, n.e.s.
87087050	Aluminium road wheels, aluminium parts and accessories thereof, for tractors, motor vehicles for the transport of ten or more persons, motor cars and other motor vehicles principally designed for the transport of persons, motor vehicles for the transport of goods and special purpose motor vehicles (excl. those for the industrial assembly of certain motor vehicles of subheading 8708.70.10)
87083010	Brakes and servo-brakes and their parts, for the industrial assembly of: pedestrian-controlled tractors, motor cars and vehicles principally designed for the transport of persons, vehicles for the transport of goods with compression-ignition internal combustion piston engine "diesel or semi-diesel engine" <= 2500 cm³ or with spark-ignition internal piston engine <= 2800 cm³, special purpose motor vehicles of heading 8705, n.e.s.
87083091	Parts for disc brakes, for tractors, motor vehicles for the transport of ten or more persons, motor cars and other motor vehicles principally designed for the transport of persons, motor vehicles for the transport of goods and special purpose motor vehicles, n.e.s. (excl. those for the industrial assembly of certain motor vehicles of subheading 8708.30.10)
87085020	Drive-axles with differential, whether or not provided with other transmission components, and non-driving axles, and parts thereof, for the industrial assembly of: pedestrian-controlled tractors, motor cars and vehicles principally designed for the transport of persons, vehicles for the transport of goods with compression-ignition internal combustion piston engine "diesel or semi-diesel engine" <= 2500 cm³ or with spark-ignition internal piston engine <= 2800 cm³, special purpose motor vehicles of heading 8705, n.e.s
87085055	Parts for drive-axles with differential, whether or not provided with other transmission components, and for non-driving axles, of closed-die forged steel, for tractors, motor vehicles for the transport of ten or more persons, motor cars and other motor vehicles principally designed for the transport of persons, motor vehicles for the transport of goods and special purpose motor vehicles, n.e.s. (excl. those for the industrial assembly of certain motor vehicles of subheading 8708.50.20)
87085099	Parts for drive-axles with differential, whether or not provided with other transmission components, for tractors, motor vehicles for the transport of ten or more persons, motor cars and other motor vehicles principally designed for the transport of persons, motor vehicles for the transport of goods and special purpose motor vehicles, n.e.s. (excl. those for the industrial assembly of certain motor vehicles of subheading 8708.50.20, for non-driving axles and of closed-die forged steel)
87088099	Suspension systems and parts thereof, for tractors, motor vehicles for the transport of ten or more persons, motor cars and other motor vehicles principally designed for the transport of persons, motor vehicles for the transport of goods and special purpose motor vehicles, n.e.s. (excl. those for the industrial assembly of certain motor vehicles of subheading 8708.80.20, shock-absorbers, anti roll bars, torsion bars and those of closed-die forged steel)

CN8 Code	Description
87089120	Radiators and parts thereof, for the industrial assembly of: pedestrian-controlled tractors, motor cars and vehicles principally designed for the transport of persons, vehicles for the transport of goods with compression-ignition internal combustion piston engine "diesel or semi-diesel engine" of a cylinder capacity <= 2500 cm³ or with spark-ignition internal piston engine of a cylinder capacity <= 2800 cm³, special purpose motor vehicles of heading 8705, n.e.s
87089135	Radiators for tractors, motor vehicles for the transport of ten or more persons, motor cars and other motor vehicles principally designed for the transport of persons, motor vehicles for the transport of goods and special purpose motor vehicles (excl. those for the industrial assembly of certain motor vehicles of subheading 8708.91.20)
87089199	Parts for radiators, for tractors, motor vehicles for the transport of ten or more persons, motor cars and other motor vehicles principally designed for the transport of persons, motor vehicles for the transport of goods and special purpose motor vehicles, n.e.s. (excl. those for the industrial assembly of certain motor vehicles of subheading 8708.91.20 and those of closed-die forged steel)

Source: Combined Nomenclature (CN) - Goods categorisation

Table 6. List of cutlery products linked to downstream goods

CN8 Code	Description
82151010	4sets of spoons, forks or other articles of heading no 8215, incl. those with up to an equal number of knives, of stainless steel, containing at least one article plated with precious metal
82151030	Sets consisting of one or more knives of heading 8211 and at least an equal number of spoons, forks or other articles of heading 8215, of stainless steel, containing at least one article plated with precious metal
82152010	Sets consisting of one or more knives of heading 8211 and at least an equal number of spoons, forks or other articles of heading 8215, of stainless steel, containing no articles plated with precious metal
82159910	Spoons, forks, ladles, skimmers, cake-servers, fish-knives, butter-knives, sugar tongs and similar kitchen or tableware of stainless steel, not plated with precious metal (excl. sets of articles such as lobster cutters and poultry shears)

Source: Combined Nomenclature (CN) - Goods categorisation

Emissions from the use of electricity in the manufacturing of CBAM goods are only covered by the CBAM for cement products, fertilisers and agglomerated ore (for steelmaking). For the ***extension to indirect emissions***, we assume that indirect emissions are covered for all CBAM goods.

For the ***extension to new products***, we assumed the following:

Refinery products: The selection of refinery products was based on a study by Concawe[29] which estimated the emissions intensities of 17 key refinery products in Europe, distributed into 9 main categories: Liquefied Petroleum Gas (LPG), Naphtha, Gasoline, Kerosene, Diesel, Heating Oil Marine Diesel, Distillate Marine Fuel Residual Marine Fuel 0.5% Sulfur, and High Sulfur Fuel Oil.

Chemicals: We focused on key products from the most emissions intensive

29 Concawe, 2022, Estimating the CO2 intensities of EU refinery products: statistical regression methodology

chemical production processes, as identified in a 2017 report by the JRC.[30] From the steam cracking process, the products selected were ethylene, propylene, butadiene and butene, while the main aromatics considered are benzene, toluene, styrene and xylene. Methanol is also included due to significant EU production and import levels.

Polymers: We have selected seven polymers for inclusion in the study based on an analysis carried out by Eionet.[31:] The analysis found that production of these polymers accounted for more than 80% of polymer production emissions in the EU. The selected polymers are high- and low-density polyethylene (HD- and LD-PE), polyethylene terephthalate (PET), polypropylene (PP), expanded polystyrene (PS), polyurethane (PU) and polyvinylchloride (PVC).

5.2 Scenarios of reactions to the CBAM

Predicting the CBAM's impact requires assumptions not only on the regulation's future but also on the way trade partners will adapt or respond to it. We have considered three scenarios of such reactions described below: *business-as-usual*, *resource shuffling* and *introduction of carbon pricing*.

In the ***business-as-usual*** scenario, trade patterns are unchanged: third countries continue to export the same quantities of the same products to the EU, manufactured using the same production processes as today.

In the ***resource shuffling*** scenario, trade partners adapt their trade flows to export to the EU the same products but having selected the inputs and processes available in those countries that create the least emission-intensive products, without significantly changing production methods, in order to minimise CBAM costs.

The reporting regulation in place for the transitional period considers steel and aluminium scrap as zero-carbon (even pre-consumer scrap). If this same regulation applies after the transitional period, a simple way to reduce CBAM charge will be to increase the content of scrap in exported products.

Like aluminium, steel is highly recyclable, and the quality of recycled steel can match that of primary material if mixed with a certain quantity of direct reduced iron (DRI) or pig iron. Embedded emissions from DRI are much lower than those of blast-furnace steel if made from natural gas, so for the mix (DRI + scrap) it is considered even lower.

Given the high availability of scrap in some regions and that substitution may happen fairly quickly, the following assumptions were taken to define the *resource shuffling* scenario.

- Imported steel products are primarily produced using electric arc furnaces (EAF) powered by scrap, provided there is sufficient production capacity. Globally, flat steel production uses a maximum of 65% scrap steel. This proportion reflects the actual share of scrap used in U.S. flat steel production, where 60% of flat steel is made

30 A. Boulamanti and J.A. Moya, Energy efficiency and GHG emissions: Prospective scenarios for the chemical and petrochemical industry, EUR 28471 EN, doi:10.2760/20486

31 Eionet Report – ETC/WMGE 2021/3 Greenhouse gas emissions and natural capital implications of plastics (including biobased plastics)

via EAF with 55% scrap, while 40% is produced via BF-BOF[32] using 9% scrap. The high-quality scrap required for flat steel production prevents this proportion from reaching 100%. If sufficient EAF capacity is available, flat steel is produced using EAF with 64% scrap and 36% DRI (primarily from natural gas). If EAF capacity is insufficient, production is adjusted to use a maximum of 55% scrap in EAF, with the remainder produced via BF-BOF.
- Aluminium imports are made of **80%** remelted scrap.
- Imported cement products are made of **20%** clinker. Clinker imports are replaced by cement imports.

Regarding indirect emissions, resource shuffling enables trade partners to cover 50% of the electricity use through PPAs (based on load factors achievable through renewables), meaning that only half of the electricity is declared with country emission intensity.

In the ***introduction of carbon pricing*** scenario, third countries choose to apply a carbon price of €**50** per tonne of CO_2e. This value may seem arbitrary, as there is no way of telling how much greenhouse gas emissions will be priced for outside the EU, and it will surely not be a uniform price across all countries. However, €50 was the price recently observed in the UK (the main market outside the EU covering similar emissions) in February 2025. It is a non-negligible value but not quite as high as the EU price, which is probably the most interesting case for EU trade partners.

5.3 Emission intensity calculation methodology

All calculations rely on estimations of the emission intensities of the products covered by the CBAM manufactured by different trade partners.

There are no publicly available emission intensity data that exactly match the CBAM process boundaries for all countries outside the EU. We therefore estimated these figures using a few key parameters listed in Table 7. Key parameters for scenario definitions.

Table 7. Key parameters for scenario definitions

Product type	Key parameters
Steel	Whether long or flat products; percentage of scrap, pig iron and DRI; emission intensity of DRI and pig iron
Aluminium	percentage of scrap vs. primary aluminium, emission intensity of primary aluminium
Cement	percentage of clinker, emission intensity of clinker
Fertilisers	emission intensities for products produced via the mixed acid route for goods containing nitrogen, nitrates, phosphates, and potassium

Source: Sandbag

For countries where one of these parameters was missing, we estimated it based on "similar" countries, based on relevant criteria. For aluminium, regional data is applied to all countries within each region. For steel, where this information was not available, we estimated the breakdown between

32 Nucor, Netzeros Steel Project

long and flat products based on countries of similar GDP per capita, and BF-BOF emission intensity based on the emission intensity of nearby countries or, if still unavailable, the global average of 2.28 tCO_2/t (according to JRC).

Assumed values for the above parameters in different countries can be found in tables in Annex II.

In each broad category of products (such as “flat steel”, “long stainless steel”, etc.), we calculated the emissions intensity of the least finished product using the above key parameters, then for the more finished products we added the same difference between basic and finished products as in the JRC study published by the European Commission in October 2023[33], either at country or weighted average level, depending on availability. Calculations are detailed in Annex II.

6. Simulating CBAM impacts

Whereas we presented the CBAM in its current form in chapter 2, and scenarios for its possible evolutions in chapter 5, in this chapter we will simulate the impacts of the CBAM on 20 selected individuals countries. We do this to showcase the magnitude of such impact and compare this impact between countries depending on different scenarios and metrics used.

All calculations are assumed to be for the period after full phase out of free allocation in the EU ETS for products covered by the CBAM. They were done using Sandbag’s in-house modelling, based on multiple sources of data and assumptions detailed in chapter 5, and made available online in **Sandbag’s CBAM Simulator**.

6.1 Selection of countries

In this chapter, we will display results for a selection of 20 individual countries, whereas the rest will be grouped as “rest of the world” (ROW). The 20 trade partners were selected mainly as those likely to pay the highest CBAM fees in absolute terms in our business-as-usual scenario.

A list of the top 20 countries ranked by estimated CBAM fees is presented inTable 8. Top 20 Highest Estimated CBAM Fees and Countries with Strong CBAM Reaction8. The table also shows the share that these fees represent of the value of imports from each country for both CBAM-covered goods and all goods. CBAM fees are estimated under the CBAM’s current scope. 2023’s trading values were used to calculate the fees and for United Kingdom fees, fees were discounted by the value of UK allowances, i.e. close to **€50** on average over a six-month period.

33 JRC (2023) Greenhouse gas emission intensities of the steel, fertilisers, aluminium and cement industries in the EU and its main trading partners

Table 8. Top 20 Highest Estimated CBAM Fees and Countries with Strong CBAM Reaction

Ranking CBAM Fees	Country	CBAM Fees (€m/ year)	CBAM fees (€m) / Imports of CBAM Products	CBAM fees (€m/year) / Imports of all product
1	**India**	1,336	19.44%	4.26%
2	**Russia**	1,194	20.18%	3.55%
3	**People's Republic of China**	1,012	6.22%	0.43%
4	**Ukraine**	869	29.55%	7.39%
5	**Türkiye**	840	8.53%	4.99%
6	**Vietnam**	603	21.95%	2.16%
7	**Egypt**	574	22.71%	10.63%
8	**South Korea**	503	10.48%	1.74%
9	**Algeria**	447	41.21%	2.09%
10	**Taiwan**	413	10.12%	1.20%
11	**United States**	351	8.43%	0.14%
12	**Brazil**	286	15.02%	0.81%
13	**Japan**	285	11.63%	0.96%
14	**Canada**	273	15.45%	1.24%
15	**Indonesia**	236	26.88%	2.96%
16	**South Africa**	181	15.50%	1.71%
17	**United Arab Emirates**	171	7.67%	1.27%
18	**Trinidad and Tobago**	135	31.72%	6.66%
19	**United Kingdom**	131	1.71%	0.16%
20	**Malaysia**	121	12.16%	0.62%
22	**Bosnia and Herzegovina**	79	7.20%	4.39%
62	**Montenegro**	2	0.29%	1.38%
TOTALS				
20 selected countries (in bold)		**9,790**	**13.26%**	**1.20%**
Rest of the World (ROW)		**1,514**	**6.86%**	**0.36%**

Source: Sandbag's CBAM Simulator

Some countries have publicly spoken against the CBAM. Most of them are among the 20 most exposed ones: India called it "discriminatory", later echoed by the full BRICS group (Brazil, Russia, India, China and South Africa at the group's 2024 summit)[34]; the same (without Russia) called it "unilateral", "unjustifiable, "arbitrary" (at COP28, as part of the BASIC group)[35]; China

34 Indian Express (2024) *BRICS bloc endorses India's stance on EU's carbon tax; pushes for local currency settlements*

35 Zero Carbon Analytics (2024) Carbon Border Adjustment Mechanisms require coordinated global action

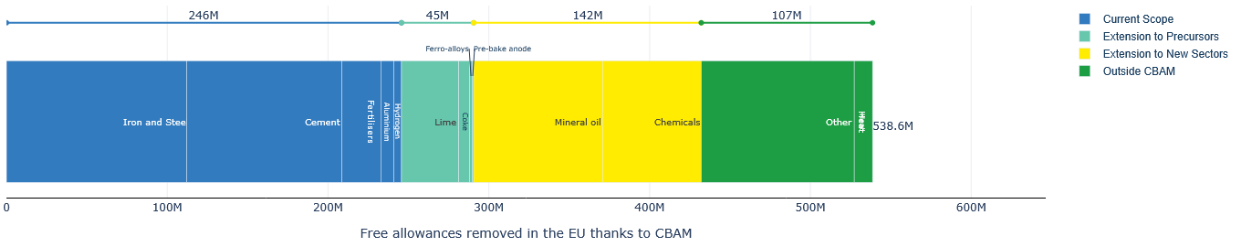
called it "protectionist" and "unfair to the global south"[36], while the United States called it a tool that "should be used as last resort" (US)[37]. Less exposed countries have also expressed opposition: Bosnia Herzegovina and Montenegro complained about the policy's administrative costs, especially for small exporters (at a meeting of the Energy Community Ministerial Council)[38].

In our list of selected countries, we replaced the bottom two countries (the UK and Malaysia) with Bosnia Herzegovina and Montenegro. The 20 selected countries cover **87%** of total CBAM fees to be paid worldwide.

6.2 Free allowances - EU

The most remarkable impact of the CBAM is its ability to remove the wrong incentives set by free allocation in the EU ETS, as commented in 2.2. In its current form, the CBAM will allow to phase out **246** million free allowances per year (46%) compared to 2023 across all sectors. If upstream products are added to the CBAM, this impact will increase to **291** million removed free allowances. If refinery products and chemicals are added, this will rise to **432** million, i.e. **80%** of all free allowances. At **€80** per allowances, this is equivalent to **€35 billion in permits that would no longer be given for free**. Those numbers are illustrated byFigure 8 : Free allowances removed after full CBAM implementation, compared to 2023 (in millions of EUA per year)8.

Figure 8 : Free allowances removed after full CBAM implementation, compared to 2023 (in millions of EUA per year)



Source: Sandbag, using data from the EU Transaction Log

6.3 Unitary carbon costs: EU producers vs. importers

Another measure of the CBAM's impact is the comparison, as a measure of competitiveness, of the carbon costs borne by importers covered by the CBAM with those borne by EU producers covered by the EU ETS. We here compare costs for a small selection of goods and countries, assuming the CBAM keeps its current scope.

6.3.1 Different sources of costs and revenues

Carbon costs are borne in different ways by different parties. Importers will

36 Chatham House (2024) The future for global trade in a changing climate
37 Chatham House (2024) The future for global trade in a changing climate
38 Balkan Green Energy News (2024) *BiH, Montenegro ask EU to delay CBAM*

need to buy CBAM certificates; EU-located plant operators will need to buy allowances without receiving any for free; EU plants operators also pay for carbon through their purchase of electricity (indirect costs); and all parties will earn extra revenues thanks to the passing through of carbon costs to their customers.

For those calculations, we assumed a price of 80€ for European emission allowances. This is close to the current market price in February 2025, so we didn't presume any change, up or down, due to the large uncertainty regarding key elements of the carbon market's key features after 2030: its cap, and the ability to comply with it through carbon credits.

6.3.2 For importers: CBAM certificates

For importers, carbon costs are the cost of acquiring CBAM certificates. The price of each CBAM certificate is the ETS allowance price, assumed to be **€80** (as explained in 5.1). The number of necessary certificates corresponds to the embedded emissions of the goods as calculated by the CBAM methodology.

The carbon price paid in the country of origin of the goods is then deducted. As free allocation in the EU ETS is considered completely phased out for CBAM product types, there is no related deduction.

6.3.3 For EU producers: emission permits

For EU producers, emission costs correspond to the purchase of emission allowances. without receiving any free allowances. Costs for EU plants are therefore defined as their greenhouse gas emissions (in tonnes of CO2e) times the price of an allowance (assumed to be **€80**).

6.3.4 For EU producers: indirect carbon costs

On top of their compliance costs to the EU ETS, EU electricity users face "indirect" costs due to the increase in electricity market prices applied by power producers. The EU electricity market correlates power prices with marginal production costs (and not total costs), which means that prices are driven by the cost of fossil electricity generation rather than average electricity generation. In other words, even in countries with high shares of renewable or nuclear electricity, the increase in European power prices caused by carbon pricing is driven by the emission intensity of fossil power plants.

Member States are authorized to compensate for these costs using a compensation mechanism. Indirect cost compensation (ICC) is defined by the formula[39]:

$$ICC=75\% \times C_t \times P_{\{t-1\}} \times E \times AOt$$

C_t is the applicable fossil-based CO2 emission factor as defined in the State aid Guidelines (tCO2/MWh) (in year t). We have chosen the fossil emission factor used in the State Aid Guidelines for the region covering Germany,

39 Supplementing the Guidelines on certain State aid measures in the context of the system for greenhouse gas emission allowance trading post-2021

Austria and Luxembourg, which is 0.72 tCO_2/MWh, as it is the area containing the most industrial plants in Europe. P_{t-1} is the EUA forward price at year t-1, which we also assumed as **€80**. E is the applicable product-specific electricity consumption efficiency benchmark [40], this value varies depending on the product, AOt is the actual output in year t.

As these calculations assume that the CBAM covers the same scope as today (i.e. without indirect emissions), they also assume that ICC is still in place. As ICC covers 75% of the total carbon costs, we only counted the remaining uncompensated 25% in the unitary carbon costs for EU producers.

The UK also has a compensation mechanism for indirect carbon costs. However, like in the EU, this compensation does not fully cover the electricity carbon costs. The remaining costs, not covered by the compensation, are also added to the unitary carbon costs for UK producers.[41]

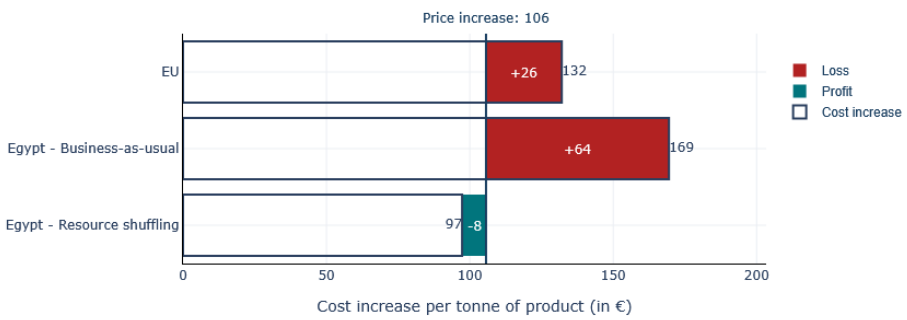
6.3.4.1. For both importers and EU producers: revenues from higher product prices

As free allowances are phased out in the EU ETS, EU-located factories will bear increasing carbon costs under the EU ETS, which they will aim to pass through to their clients. The proportion of those costs that firms can pass on to their customers (the ***cost pass-through rate***) depends on demand elasticity and the CBAM's effectiveness at mirroring EU carbon prices. Based on previous research[42], and on the existence of provisions against circumvention in the CBAM regulation, we assumed a pass-through rate of 80%. In other words, CBAM goods will be sold in the EU at a premium (e.g. a **price increase**) equal to 80% of average ETS costs.

6.3.4.2. Results

The following charts are examples of comparisons between CBAM cost for importers and EU ETS costs for EU producers.

Figure 9: Flat Steel Unitary Carbon Costs Egypt vs EU



Source: Sandbag CBAM Simulator

Most of Egypt's flat steel is produced using gas-fired DRI with low scrap content.[43] Compared to the EU's, Egypt's goods are slightly more emission-intensive, which would make the CBAM cost increase higher for importers

40 COMMISSION IMPLEMENTING REGULATION (EU) 2021/447

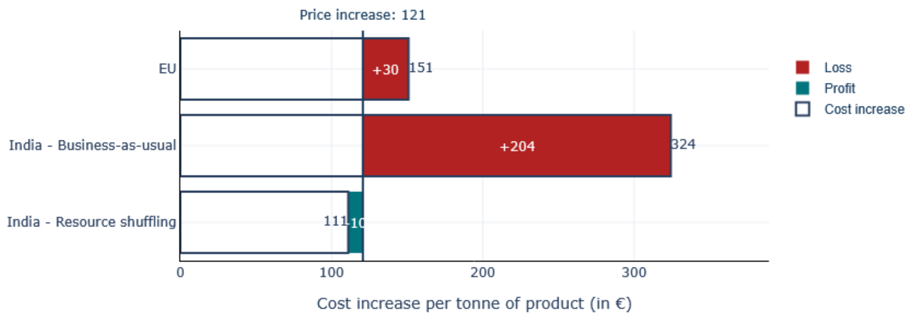
41 Gov.uk, Compensation for the indirect costs of the UK ETS and the CPS mechanism: guidance for applicants

42 Sandbag (2023) A Scrap Game: impacts of the EU Carbon Border Adjustment Mechanism

43 Data from netzeroindustry, IE, Global Energy monitor and worldsteel

than for EU producers, at **€169** compared to **€132** respectively per tonne of steel. Once netted against **€106** added revenues caused by rising steel price, the impact is a net cost of **€64** for imports vs. **€26** for EU goods, per tonne of flat steel in the *business-as-usual* scenario. However, with resource shuffling, emission intensity falls, thanks to the ability to mix DRI with scrap in Egypt's electric furnaces, turning the net cost into **a net profit of €8** for imports, as shown in Figure 9**.**

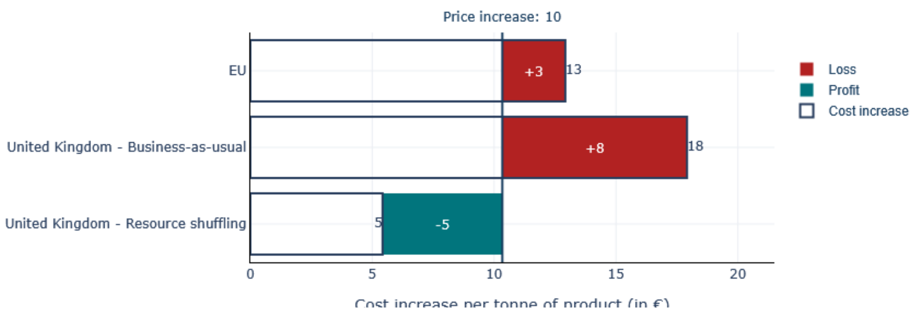
Figure 10: Flat Stainless Steel Unitary Carbon Costs India vs EU



Source: Sandbag CBAM Simulator

India's steel production is dominated by the BF-BOF route, which makes stainless flat steel emission intensity quite high, at 4.05 tonnes of CO_2 per tonne of steel[44]. As showed bFigure 10: Flat Stainless Steel Unitary Carbon Costs India vs EU10, India's stainless flat steel products would cost **€324** more due to the CBAM, but €121 extra revenue would reduce **the net cost down to €204** per ton of stainless flat steel. European producers would only bear **€30** net costs per tonne. However, with resource shuffling, India would replace its BF-BOF based exports with products made from scrap and gas DRI (of which it already has enough capacity), changing the net cost into a **€10 net profit** per tonne of stainless flat steel.

Figure 11: Long Steel Unitary Carbon Costs United Kingdom vs EU



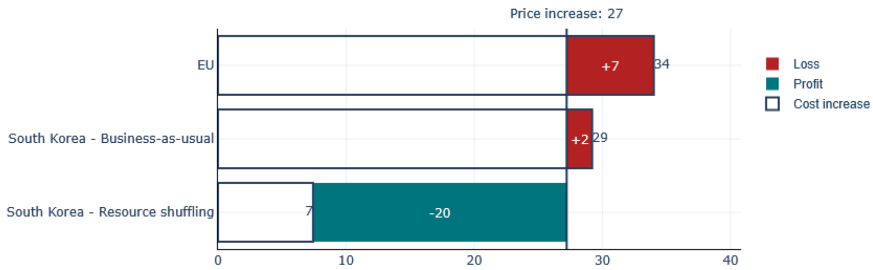
Source: Sandbag CBAM Simulator

The UK is the fourth largest exporter of long steel products to Europe. The country's long steel goods are slightly more emission-intensive than the EU's, making the CBAM cost **€18** more for imports compared to only **€13** for EU goods. But in the *resource shuffling* scenario the difference is reversed, with a **€5** net gain for UK goods vs. a **€3** net cost for EU goods. In the *resource*

44 Sandbag's calculation is derived from the JRC report "Greenhouse intensity of the EU steel industry and its trading partners". The emission intensity of the BF-BOF route in India is 3.96 tCO_2 per tonne.

shuffling scenario, the UK's long steel production shifts from 75% to 100% scrap use, significantly lowering its carbon intensity. Although part of the carbon costs borne for UK products are paid in the form of allowances under the UK ETS, subtracted from CBAM costs, the domestic carbon price does not affect the bottom line for individual UK exports.

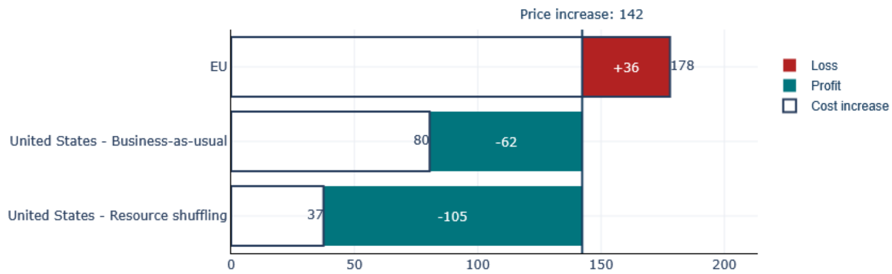
Figure 12: Long Stainless-Steel Unitary Carbon Costs South Korea vs EU



Source: Sandbag, based on data from Eurostat, the European Commission and academic sources

South Korea is the fifth largest exporter of long stainless-steel products to Europe. The country's production relies on **96%** EAF route. This should make South Korean products cost **€29** more due to the CBAM, with a net cost (after **€27** extra revenue) of **€2** per tonne of steel. However, with resource shuffling, the share of EAF rises to 100%, driving emissions down and resulting in a **€20** net profit.

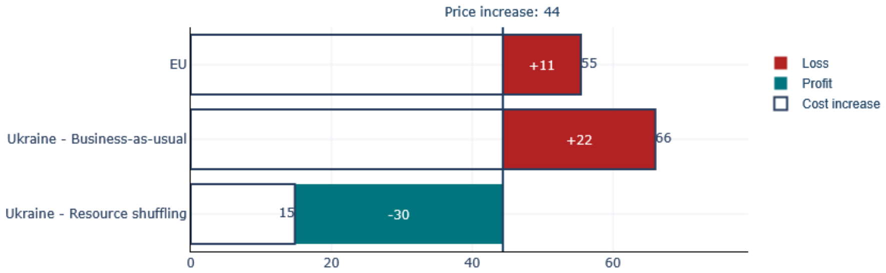
Figure 13: Aluminium Unitary Carbon Costs US vs EU



Source: Sandbag CBAM Simulator

Aluminium production in the United States has low direct emissions thanks to already high scrap content, 57%. This allows the US aluminium producers to benefit from a profit of **€62** per ton of aluminium sold in Europe. The *resource shuffling* scenario proposes shifting production to 80% remelted scrap, which could increase profit up to **€105**.

Figure 14: Grey Portland Cement Unitary Carbon Costs Ukraine vs EU



Source: Sandbag CBAM Simulator

Ukraine's grey Portland cement products would cost €66 more with the CBAM vs. €55 for similar EU products. Netted with €44 revenue from expected price increase, the cost would be **€22** per tonne of cement, compared to **€8** for EU producers. In the *resource shuffling* scenario, Portland cement imports are substituted by low-clinker alternatives, creating a net profit of **€30** per tonne.

6.4 CBAM fees for importers

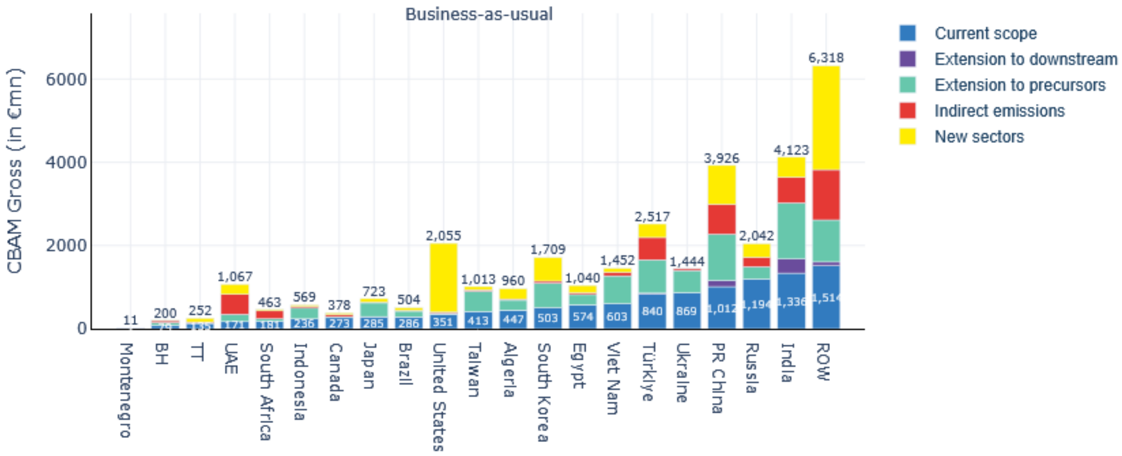
Having compared unitary costs, we now look at country-level impacts. Figure 15, Figure 16 and Figure 17 present estimated CBAM fees to be paid for products imported from each country in each scenario. These calculations are based on 2023 trade volumes rather than future projections[45].

In the *introduction of carbon pricing* scenario, we assumed that importers pay in the country of origin of the goods a price of **€50** per tonne of CO2e for CBAM goods (compared to **€80** paid by EU producers). This carbon price is therefore deducted from the cost of acquisition of CBAM certificates.

Under *business-as-usual*, in the current scope, CBAM fees amount to **€11.3** billion across all countries and €9.7 billion for the 20 selected countries. This represents **1.2%** of the total value of goods imported from these 20 countries. However, this ratio varies widely between countries. For example, the United States and the People's Republic of China face fees equivalent to just **0.1%** and **0.4%** of the value of their exports, respectively, while Egypt and Ukraine see much higher rates at **11%** and **7%**, respectively. CBAM fees can be reduced down to **€7.3** billion (worldwide) if producers in exporting countries do resource shuffling, and even further down to **€7.0** billion if their national authorities set up carbon pricing.

45 European Commission Comext Database (2023) Adjusted extra-EU imports since 2002 by tariff regime, by HS2-4-6 and CN8 (DS-059339)

Figure 15. CBAM Fees for the business-as-usual scenario per country in €mn



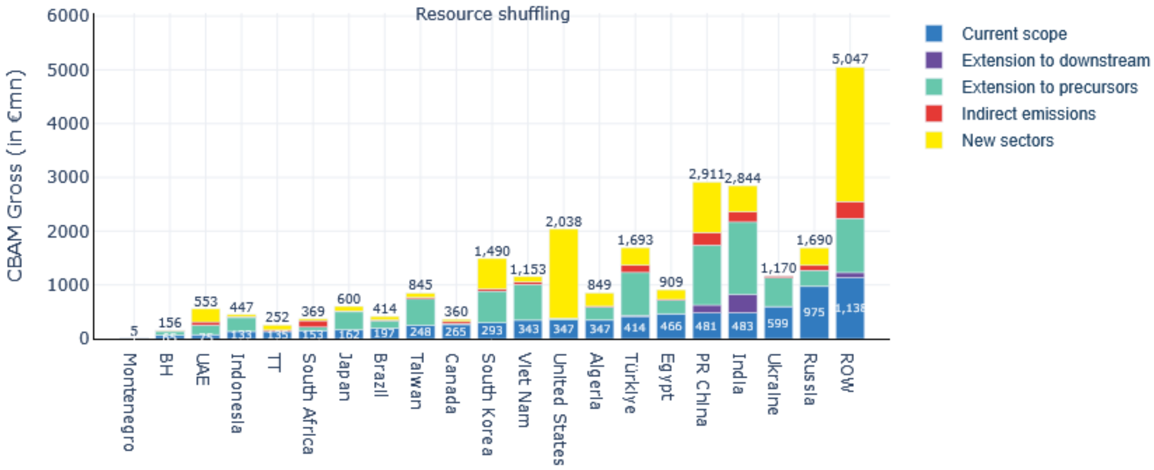
Source: Sandbag, based on data from Eurostat, the European Commission and academic sources

Products from India and Russia face the highest amount of CBAM fees under the current scope. However, if the scope was extended to precursors such as coke and lime, Indian and Chinese goods would be charged the most, with **€1,347** and **€1,114** respectively, followed by Turkish goods, which would incur an additional **€801**. A similar pattern emerges with the inclusion of indirect emissions, where India, China, Russia, and Turkey would be most affected, with additional fees of **€615**, **€718**, **€535**, and **€225**, respectively.

If the CBAM was extended to new sectors, the United States would be most impacted by such extension, facing **€1,656** more CBAM fees annually, as the country accounts for 10% of the EU's refinery product imports. China would follow, with **€936** in additional charges, due to its high exports of organic chemicals. In contrast, extending the scope to downstream products would have a less relevant impact, affecting mostly India, PR China and some additional countries grouped in the "Rest of the world" group, leaving the ranking of affected countries largely unchanged.

India's high ranking comes from the fact that the country's BF-BOF (blast furnace – basic oxygen furnace) steelmaking route is very carbon-intensive.

Figure 16: CBAM Fees for the resource shuffling scenario per country in €mn



Source: Sandbag, based on data from Eurostat, the European Commission and academic sources

India's ranking would drop to third place (under the current scope) if its manufacturers did resource shuffling, because India produces enough steel scrap and DRI to export goods with lower reported emissions.

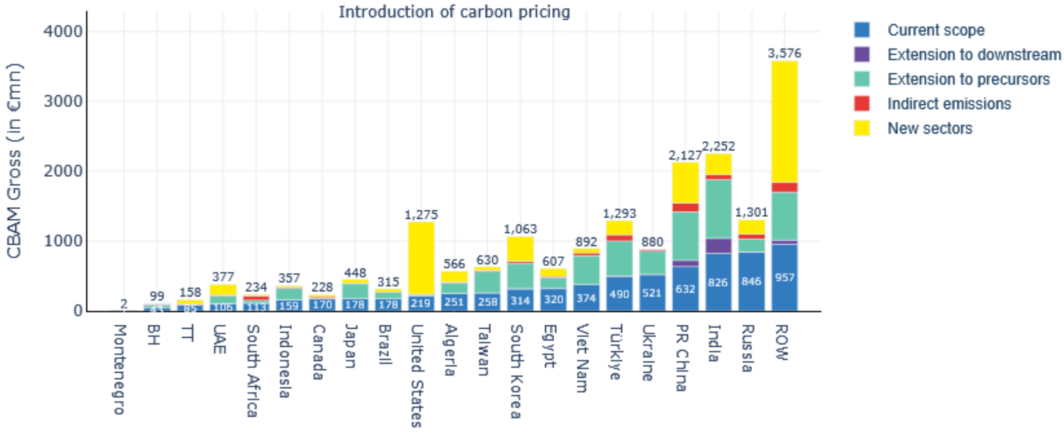
In contrast, Russia, whose steel is less carbon-intensive under the current scope, shows a smaller gap between *business-as-usual* and *resource shuffling*. Moreover, Russia is the world's largest exporter of fertilisers, a sector where we don't see much resource shuffling opportunities, which limits fluctuations in its attributed emissions.

Ukraine, on the other hand, shows relatively stable emissions between *business-as-usual* and *resource shuffling*. This is because Ukraine's Electric Arc Furnace capacity (which allows for higher scrap use) is only about 5% of its total capacity, with an already high scrap content, making resource shuffling less possible.

Countries such as the United Arab Emirates, People's Republic of China, Türkiye, Montenegro, Indonesia, Vietnam, Japan, South Korea and Taiwan could significantly benefit from a resource shuffling scenario, reducing their CBAM fees by up to 56% in the case of the UAE and 40% for Taiwan. This reduction potential is mainly due to high average carbon intensity of their production.

In contrast, countries like the United States and Canada would benefit less from resource shuffling, with reductions in CBAM fees between just 1% and 3%.

Figure 17 : CBAM Fees for the resource shuffling scenario per country in €mn



Source: Sandbag, based on data from Eurostat, the European Commission and academic sources

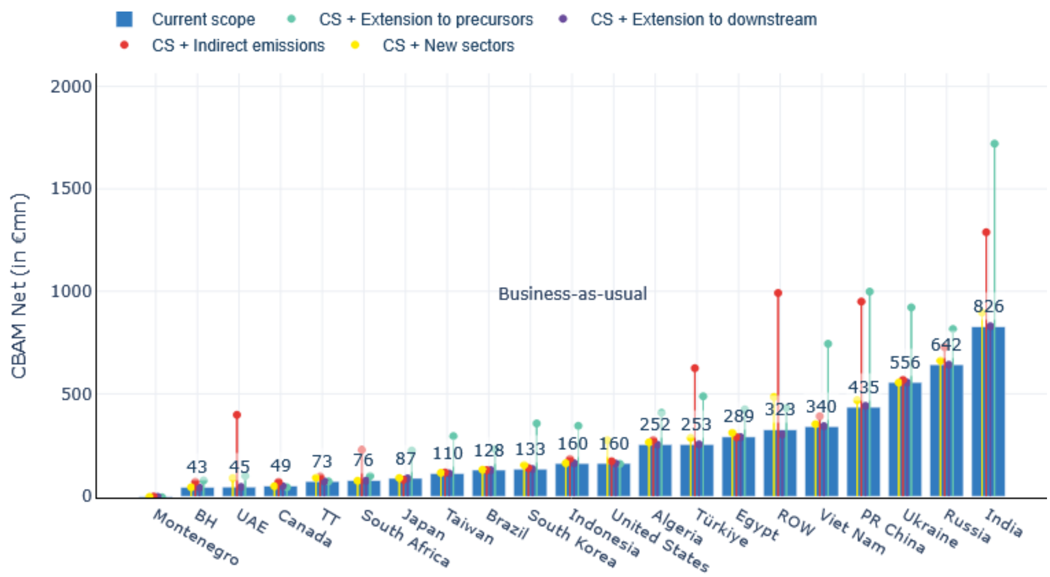
The introduction of carbon pricing proves to be beneficial to all countries, reducing the amount of CBAM fees significantly.

6.5 CBAM net costs, for exporting countries

As previously explained, CBAM costs are likely to be partly recouped by importers thanks to higher selling prices in the EU market. Appendix II spells out how we estimated this effect for indirect emissions as well, if they were also covered by the CBAM.

Figure 18, Figure 19 and Figure 20 show net CBAM costs for our selected countries in each scenario. The blue bars represent the net costs under the current scope, whereas the vertical lines show the net costs after extending the scope to each extra scope extension.

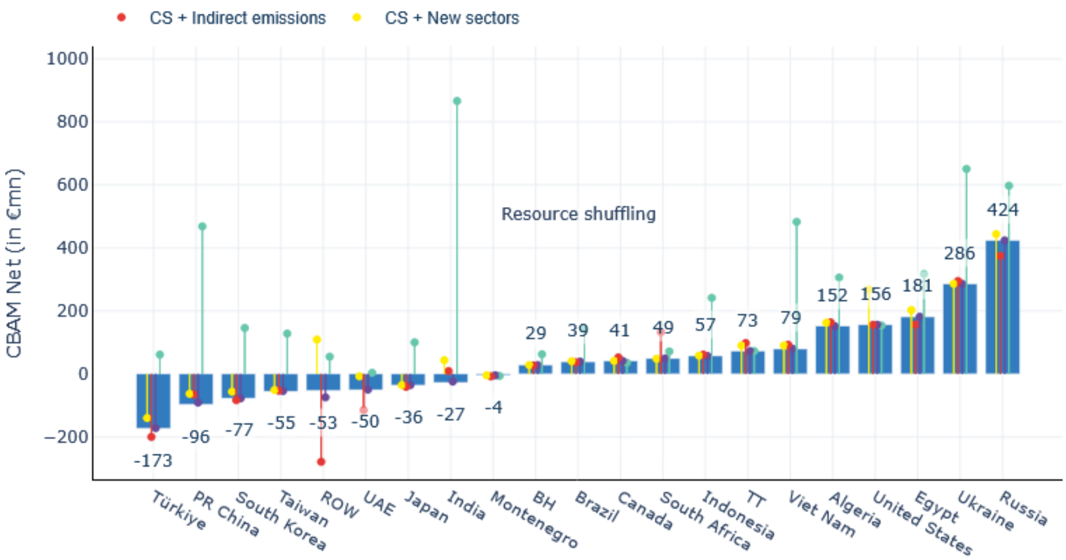
Figure 18: CBAM Net Fees for the business-as-usual scenario per country in €mn



Source: Sandbag, based on data from Eurostat, the European Commission and academic sources

In the business-as-usual scenario with the current scope, net CBAM costs amount to **€4,978** million across all countries. As shown on Figure 18, India, Russia, Ukraine, PR China and Vietnam's belong to the top 5 with highest fees and are overall higher than the total amount of the "Rest of the world" group.

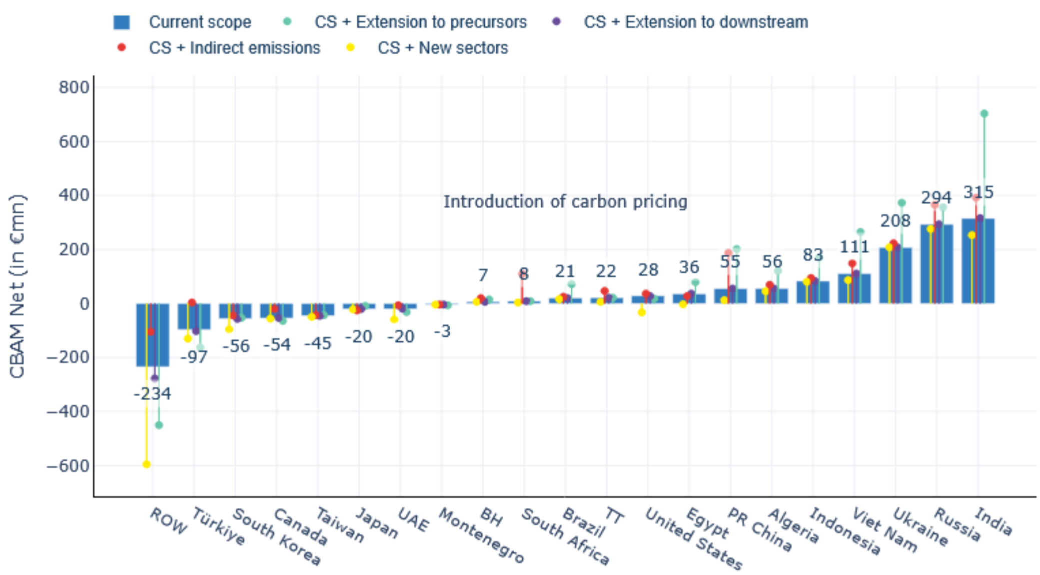
Figure 19 : CBAM Net Fees for the resource shuffling scenario per country in €mn



Source: Sandbag, based on data from Eurostat, the European Commission and academic sources

CBAM Net Fees decrease to **€995** million if exporters do resource shuffling. Almost half of the selected countries (as well as the "Rest of the World" group) could make profits by doing resource shuffling (seFigure 19 : CBAM Net Fees for the resource shuffling scenario per country in €mn19). Remarkably, net CBAM costs go down to only **€715** million if trade partners implement carbon pricing. By implementing carbon pricing, many countries would keep making profits even with scope extensions.

Figure 20: CBAM Net Fees for the introduction of carbon pricing scenario per country in €mn



Source: Sandbag, based on data from Eurostat, the European Commission and academic sources

Although India is the country from which goods would bear the most net costs under *business-as-usual*, the net cost for the entire country is only **€826m** per year. Moreover, by doing resource shuffling, the country would turn the cost into a net profit, of **€27m**. Türkiye and China would benefit the most from resource shuffling, with **€173m** and **€96m** net profit, respectively.

Introducing carbon pricing also reduces net CBAM costs at country level, if one considers the aggregated money flows between countries. This means ignoring the transfers between companies located in a country and their local authority. As shown bFigure 20: CBAM Net Fees for the introduction of carbon pricing scenario per country in €mn20, with a carbon pricing scheme, Türkiye would still be the largest beneficiary, but smaller CBAM product exporters bundled in the "rest of the world" group would gain more as a whole. Net CBAM costs on Indian goods would drop down to **€315m** per year (compared to **€826m** in *business-as-usual*).

We note that, in those simulations, the carbon price paid under overseas carbon pricing schemes is only **€50**, compared to **€80** in the EU. A more expensive carbon price overseas would mechanically reduce CBAM fees and net costs at country level.

6.6 Carbon pricing as strategy of choice

The objective of this report was to paint a practical and dynamic picture of the CBAM, to help evaluate concrete implications for stakeholders, especially located outside the EU.

We approached this challenge by gathering the most relevant and comprehensive technical data we could find by concern for precision, in a limited time. The availability of data is a key obstacle for such exercise, so assumptions and approximations had to be made wherever accurate and granular data was missing, so the estimated figures presented here must not be taken as fully accurate. However, we have reasonable confidence in the broad picture painted by these results.

Firstly, the amount of fees collected by the CBAM is unlikely to exceed 1% of the value of all European imports; secondly, net costs to importers will really be a fraction of that amount, with some importers making profit out of the CBAM; thirdly, costs can be reduced further by implementing resource shuffling; and finally, implementing carbon pricing is the most beneficial option for third countries.

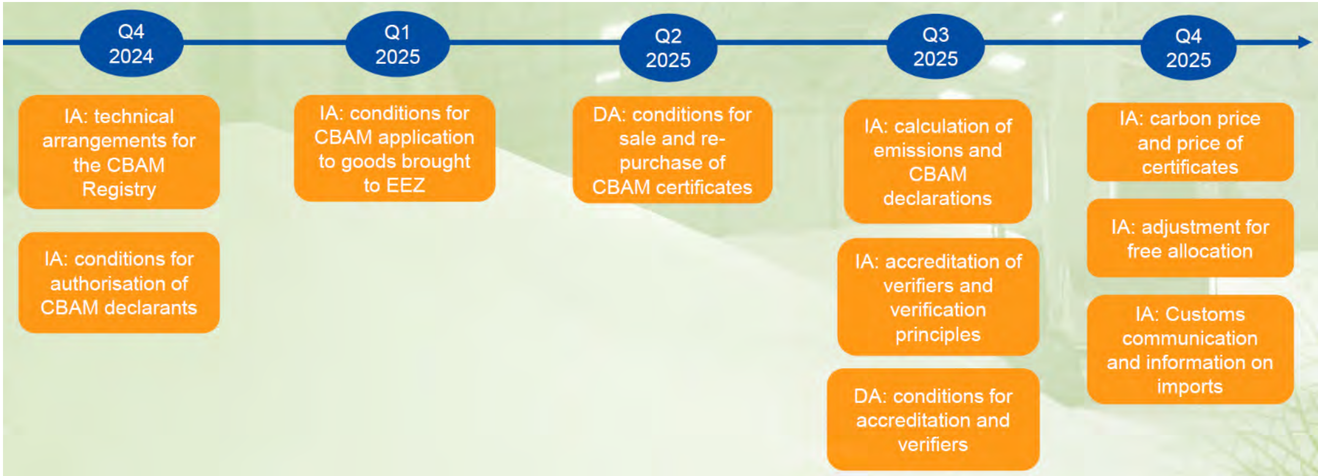
Some caution should be given to the results involving resource shuffling scenarios. Although the figures shown in this report may suggest resource shuffling happening on a massive scale, in practice this is unlikely to happen or the benefits might not be as large as suggested here. This is because in such a scenario (generalised resource shuffling) imports would get a comparative advantage sufficient to prevent EU producers from passing on their own carbon costs and create the amount of price increase for CBAM goods assumed in European markets.

In addition, resource shuffling makes goods manufactured overseas more competitive than those produced in the EU, without creating any climate benefits. The EU might therefore consider it as circumvention and amend the legislation to reduce opportunities for such practice. A report from the European Commission is expected by the end of 2025 which will cover circumvention and measures to prevent it.

It is therefore not preferable for EU trade partners to build a strategy based on resource shuffling, as it would mean relying on potentially changing rules. In contrast, implementing carbon pricing makes it possible for trade partners to dramatically reduce CBAM costs and even benefit from the CBAM, while creating emission reduction incentives. It does not create incentives for resource shuffling, because what is avoided under the CBAM is usually paid under domestic carbon pricing. Carbon pricing therefore makes overseas producers indifferent to changing EU emission reporting rules, reducing uncertainty. It is probably the safest and most climate-friendly option available to third countries.

Annex I:
Chronology of forthcoming legislation

The figure below was published by the European Commission in November 2024, i.e. at the beginning of its mandate.



Source: 2nd Meeting of the informal Expert Group on the CBAM

Legislation due by Q4 – 2024 (delayed)

IA on Application for authorisation – Article 5(8)

This will set rules and procedures for authorising CBAM declarants. It will establish a standard application format, the process for submitting applications through the CBAM registry, the stages national authorities should follow in the assessment and the timeline for processing authorising applications.

IA on Authorisation – Article 17(10)

This IA will list the conditions for granting the status of authorised CBAM declarant to EU importers, such as not being involved in serious or repeated infringements and demonstrating the financial and operational capacity of applicants to fulfil CBAM obligations. Conditions for revoking a declarant's authorisation will include serious or repeated infringements, and the IA will detail the consequences of such revocation. Consultation procedures (deadline, format...) will also be set for applications and revocations.

Legislation due by Q1 – 2025

IA on good brought from artificial islands or exclusive economic zones – Article 2(2)

This IA will ensure that the CBAM also covers goods coming from artificial islands, floating structures or exclusive economic zones that are adjacent to the customs territory of the Union.

Legislation due by Q2 – 2025

DA on Sale and repurchase of CBAM certificates – Article 20(6)

This will govern the timing and administration of the sale and repurchase of CBAM certificates, in a way consistent with the auctioning of emission allowances under the EU ETS.

Legislation due by Q3 2025

IA on CBAM declaration – Article 6(6)

This will govern the submission of CBAM declarations, including their format, required content, submission procedure and procedure for surrendering CBAM certificates.

IA on Calculation of embedded emissions – Article 7(7)

This important IA will set the rules for calculating the embedded emissions of CBAM goods. These rules will replace those set by the IA on Article 35(7) in place during the transition period. They also cover requirements for data accuracy, instructions in case of difficulties in calculating emissions, exemption criteria from using the specified methodology, based on the availability of actual emissions.

It will also include guidelines on adapting default values to specific areas, regions, or countries, considering objective factors that influence emissions, such as prevailing energy sources or industrial processes. These guidelines will be based on existing legislation for monitoring and verifying emissions from installations and data concerning installations' activities.

DA on Scope – Article 2(10-11)

A number of countries outside the EU are exempted from the CBAM because they are covered by the EU ETS (Norway, Iceland, Lichtenstein) or a scheme twinned with it (Switzerland). The list may grow in the future as more third countries adopt similar initiatives. Exemptions limited to electricity imports may also happen for territories where there are technical issues in applying the CBAM to such imports. The DA on scope will govern additions and removals of third countries and territories to/from these two lists.

DA on Accreditation of verifiers – Article 18(3)

This DA will specify the conditions for the granting and revoking of verifiers' accreditations and the oversight of accredited verifiers. It will supplement the IA under Art 18(1) which set qualification criteria for verifiers.

IA on Accreditation of verifiers – Article 18(1)

This IA will set criteria on the qualifications required from an accredited verifier.

IA on Verification principles of embedded emissions – Article 8(3)

This IA will govern the implementation of the verification principles listed in Annex VI of the CBAM Regulation. It will set guidelines covering e.g. the conditions under which a verifier may be exempted to physically visit a production facility, thresholds to determine the significance of misstatements or nonconformities and the documentation requirements for the verification report – including its format. These rules will seek equivalence and coherence with domestic procedures concerning the verification of data and accreditation of verifiers.

Legislation due by Q4 2025

IA on Carbon price paid in a third country – Article 9(4)

This IA will govern the conversion of the annual average carbon price paid in the country of origin into a corresponding reduction of CBAM certificates to be surrendered. It will include the conversion of the foreign currency carbon price into euro using the annual average exchange rate, the evidence needed to demonstrate the actual payment of the carbon price, examples of any applicable rebates or compensations, the qualifications required for the independent person certifying the imposition of a carbon price in the country of origin and the conditions to ensure the person's independence is verified.

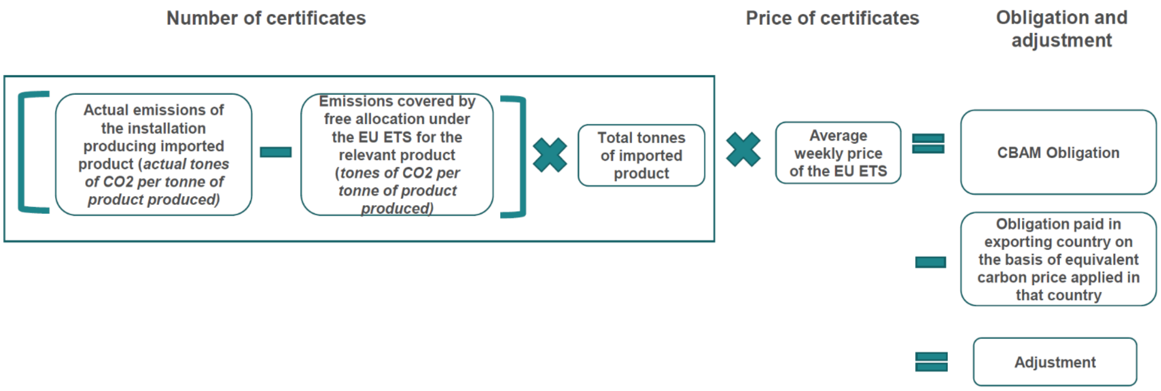
IA on Price of CBAM certificates – Article 21(3)

This will describe the methodology for calculating the average price of CBAM certificates from the EU ETS and establish practical procedures for their publication.

IA on Free allocation of allowances under the EU ETS and obligation to surrender CBAM certificates – Article 31(2)

This IA will determine the calculation of the deduction applied to the CBAM charge due to emission allowances being allocated for free to EU plants covered by the EU ETS, as illustrated by Figure 10.

Figure 10: Deduction from CBAM fee due to free allocation under the EU ETS



Source: European Commission[46]

IA on Rules applicable to the importation of goods – Article 25(6)

This will govern the circulation of information on imported CBAM goods between customs authorities, between customs authorities, Commission and competent CBAM authority of the Member State where the CBAM Declarant is established.

46 European Commission (2023), 3nd Meeting of the Informal Expert Group on the analytical methods for the monitoring, reporting, quantification and verification of embedded emissions in goods under the scope of CBAM

Legislation that may appear from 2026 onwards

DA on Circumvention – Article 27(6)

The Commission is empowered to modify the list of goods subject to the CBAM for anti-circumvention purposes.

Annex II: Emission intensity calculations

Assumed values of key parameters

Table 10. Scrap use in Aluminium production

Country	PR China	Japan	US	Oceania	Ukraine	South America	Middle East	Other Asia	North America
Scrap content in aluminium production	17.0%	82.4%	57.0%	2.7%	61.0%	57.5%	7.3%	58.7%	59.2%

Source: World Aluminium, Global Aluminium cycle 2023, Caixin Global, WEF, JRC

Table 11. Share of scrap in steel products by product type

Country	PR China	EU	India	Japan	US	Russia	S. Korea	Turkey	Brazil	Iran
Scrap per ton of long products	32.61%	98.83%	45.00%	72.47%	95.27%	57.33%	96.80%	92.67%	52.33%	1.11%
Scrap per ton of flat products	10.00%	26.71%	21.09%	21.09%	67.02%	21.09%	21.09%	21.09%	21.09%	19.88%
Country	**Ukraine**	**Mexico**	**Vietnam**	**Canada**	**Malaysia**	**Indonesia**	**Saudi Arabia**	**Egypt**	**UK**	**Bangladesh**
Scrap per ton of long products	26.19%	62.54%	53.29%	68.76%	87.94%	50.65%	12.62%	53.35%	80.33%	98.71%
Scrap per ton of flat products	21.09%	43.81%	21.09%	28.33%	51.75%	21.09%	12.62%	37.90%	21.09%	21.09%

Source: netzeroindustry, Global Energy monitor, worldsteel

Table 12. Percentage of steel production routes

Country	PR China	EU	India	Japan	US	Russia	South Korea	Turkey	Brazil	Iran
% BOF	87.3%	56.6%	61.0%	74.0%	27.4%	63.8%	66.4%	35.1%	82.8%	17.5%
% DRI Coal-based EAF	0.1%	0.0%	11.3%	0.0%	0.0%	1.9%	0.0%	0.0%	0.0%	0.0%
% DRI Gas-based EAF	0.0%	0.5%	0.0%	0.0%	3.4%	13.0%	0.0%	0.0%	0.0%	81.5%
% scrap EAF	12.6%	42.9%	27.7%	26.0%	69.2%	21.4%	33.6%	64.9%	17.2%	0.9%
Country	**Ukraine**	**Mexico**	**Viet Nam**	**Canada**	**Malaysia**	**Indonesia**	**Saudi Arabia**	**Egypt**	**UK**	**Bangladesh**
% BOF	94.7%	19.1%	66.8%	55.1%	27.1%	69.5%	0.0%	8.9%	73.7%	20.0%
% DRI Coal-based EAF	0.0%	15.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
% DRI Gas-based EAF	0.0%	15.1%	0.0%	14.0%	8.8%	0.0%	87.4%	42.5%	0.0%	0.0%
% scrap EAF	5.3%	50.6%	33.2%	30.9%	64.1%	30.5%	12.6%	48.6%	26.3%	80.0%

Source: netzeroindustry, IE, Global Energy monitor, worldsteel

Table 13. Clinker-to-cement ratio

Country	Russia	United States	PR China	World average
Clinker to cement ratio	83%	65%	60%	71%

Source: IEA, CemBR, R. Andrew (2019)

Calculations for the current CBAM scope

calculation made to estimate emission intensities of each product differs depending on the sector. Table 9. Emission intensity calculations per sector. lists the calculations for each sector. The values in blue are inhouse calculations that vary depending on different parameters stated in section 5.1. Values were updated depending on the scenario.

Table 9. Emission intensity calculations per sector.

Sector	Formula	Explanation
Aluminium	$EI_{aluminium\ product} = EI_{unwrought\ aluminium} \times 1\text{-}\%Scrap) + EI_{transformation}$	Where include the EI of primary aluminium, so we we exclude the scrap content, and is found by taking the difference between emission intensities given by JRC for unwrought aluminium (7601) and transformed products.
Iron and steel	$EI_{product} = EI_{\ BF\text{-}BOF} \times BF\text{-}BOF\ \% + EI_{DRI\ Gas\text{-}based} \times DRI\ Gas\ \% + EI_{DRI\ Coal\text{-}based} \times DRI\ Coal\ \% + EI_{Scrap\ EAF} \times Scrap\ EAF\ \% + EI_{Alloy} \times Alloy\ \% + EI_{transformation}$	The percentages for BF-BOF, DRI (gas-based: 1.5 tCO_2/tonne steel, coal-based: 2.08 tCO_2/tonne steel), and EAF come from the Net Zero Industry Tracker. Direct emissions are calculated using the Sandbag methodology, JRC data, and Chinese industry reports, incorporating scrap rates (e.g., 20% in BF-BOF). Alloy rates are either 1% or 10% for non-stainless and stainless products. is found by taking the difference between emission intensities given by the JRC for basis steel product and transformed products
Cement	$EI_{cement\ product} = EI_{clinker} \times Clinker\ to\ cement\ ratio + Indirect\ EI$	Where and and varies depending on the trading partner, the latter depends on the partner's energy mix.
Fertilisers	$EI_{fertiliser\ product} = (EI\ JRC_{fertiliser\ product} + EI\ JRC_{diammonium\ phosphate}) / 2$	The values used for fertilisers are those given by JRC, except for the products containing nitrogen, nitrates, phosphates, and potassium, for which we use the average between JRC values and the value of diammonium phosphate (31053000). This is because for these CN codes which group several products, JRC selected the EI of the most emission intensive value products. In contrast, we assume that the products can equally be the most or the least emission intensive ones.

Source: Sandbag

Calculations for scope extensions

New products within existing CBAM sectors: precursors

Iron and steel: Inclusion of lime, coke and additional ferroalloys

We used the following formula to update the emission intensities for steel products following the BF-BOF production route:

$$EI_{BF\text{-}BOF\ (with\ precursors)}$$
$$= EI_{BF\text{-}BOF\ (current\ scope)} + Alloy\ \% \times (EIAlloy\ (including\ precursors) - EI_{Alloy\ (current\ scope)})$$
$$+ pig\ iron\ \% \times (Lime\ CI_{per\ ton\ of\ steel} + Coking\ Coal\ CI_{per\ ton\ of\ steel})$$

For lime and coke, we used weighted average values from EU installations[47]. For the calculation of , we considered the ferro alloys already considered in the current scope (ferro-manganese, ferro-chromium and ferro-nickel) and added ferro-silicon and silicomanganese, using life cycle assessments for ferroalloy production[48].

Aluminium: Inclusion of pre-bake anode

We used the following formula to update emission intensities for aluminium products:

$$EI_{Aluminium\ (with\ precursors)} = EI_{Aluminium\ (current\ scope)} + EI_{pre\text{-}bake\ anode} \times (1 - \%Scrap)$$

in which values linked to pre-bake anode production were taken from an EU27 aluminium benchmark study ordered by the EC[49].

New products within existing CBAM sectors: downstream products

In the extension to downstream products scope, we considered the list of CN-8 goods mentioned in 4.3.1.3 section. We assumed emissions linked to those goods were linked to only one basis product and used the same emission intensities for the new product as for its related basis product. The CBAM fees were therefore calculated using the emission intensity of the basis product for each trading partner and the imported tonnes of product from that given partner.

The new CN-8 products are listed below, together with their related basis products and reason for this mapping. Where multiple basis products were possible, we took the most common one.

Vehicles: Parts and Accessories

47 European Commission, 2021, Update of benchmark values for the years 2021 – 2025 of phase 4 of the EU ETS. Benchmark curves and key parameters

48 Haque, Norgate (2012) Estimation of greenhouse gas emissions from ferroalloy production using life cycle assessment with particular reference to Australia

49 Ecofys, Fraunhofer, Öko (2009) Methodology for the free allocation of emission allowances in the EU ETS post 2012. Sector report for the aluminium industry

Table 14. List of CN-8 products for vehicles parts and accessories and their mapping to their given basis product

CN8 Code	Short description	Basis product	Reasoning
87084091	Parts for gear boxes of closed-die forged steel	Long steel	Gearbox parts (e.g., shafts, gears) are typically made from forged bars or rods, aligning with long steel production.
87086091	Non-driving axles and parts thereof	Long steel	Axles and similar components are almost always from long steel (bars, forgings), due to their need for strength and durability.
87087091	Wheel centres in star form	Long steel	Wheel centres are cast, but if classifying within flat vs. long, they lean closer to long steel due to bulk and shape.
87088091	Suspension systems and parts thereof	Long steel	Suspension parts like control arms, knuckles, and linkages are forged from bars or rods, making this a long steel application.
87089191	Parts for radiators	Long steel stainless	Radiator parts like brackets or tanks could involve flat steel for stamped parts, but forged steel parts (e.g., fittings) typically lean toward long steel. Possibly stainless for some radiator-related parts due to heat and corrosion resistance, especially in premium or heavy-duty applications. However, many fittings and brackets are still carbon/alloy steel.
87089291	Parts for silencers «mufflers» and exhaust pipes	Flat steel stainless	Exhaust systems often use flat steel (sheet) for pipes, mufflers, and casings. Forged fittings might be involved, but the primary material is typically flat steel. Exhaust systems often involve stainless steel because of high-temperature corrosion resistance.
87089491	Parts for steering wheels, steering columns and steering boxes	Long steel	Steering columns, shafts, and mechanical parts are usually forged from bars or rods, making this a long steel application.
87089591	Safety airbags with inflator system and parts thereof	Flat steel stainless	Airbag housings are typically stamped from flat steel, though small inflator parts (e.g., fittings) could involve forgings from long steel. Possibly stainless for inflator components (e.g., pressure vessels) due to corrosion resistance, but other parts could still be carbon/alloy steel.
87089991	Parts and accessories of closed-die forged steel	Long steel	Closed-die forged parts are typically made from bars or billets. These are structural or mechanical components requiring strength, so carbon or alloy steel is common.
87089992	Parts and accessories of closed-die forged steel	Long steel	Same as 87089991.
87089993	Parts and accessories of closed-die forged steel	Long steel	Same as 87089991.
87087050	Aluminium road wheels	Aluminium	

Source: Sandbag, Combined Nomenclature (CN) - Goods categorisation

Cutlery

Table 15. List of CN-8 products for cutlery articles and their mapping to their given basis product

CN8 Code	Short description	Basis product
82151010	Sets of spoons, forks or other articles including those with up to an equal number of knives	Flat steel stainless
82151030	Sets consisting of one or more knives and at least an equal number of spoons, forks or other articles	Flat steel stainless
82152010	Sets consisting of one or more knives and at least an equal number of spoons, forks or other articles	Flat steel stainless
82159910	Spoons, forks, ladles, skimmers, cake-servers, fish-knives, butter-knives, sugar tongs and similar kitchen or tableware	Flat steel stainless

Source: Sandbag, Combined Nomenclature (CN) - Goods categorisation

Indirect emissions

For cement and fertilisers, indirect emissions are already included in the existing scope of CBAM calculations.

The methodology for calculating indirect emissions relies on country-specific carbon intensity factors for electricity. These factors are derived using data from Ember, which calculates grid intensity using electricity production data by fuel type sourced from the International Energy Agency (IEA). This approach ensures that the emissions factors reflect the specific energy mix and carbon intensity of electricity generation in each country. Electricity consumption per tonne of production varies significantly depending on the technology used.

Table 16. Electricity consumption in aluminium sector per tonne of production by technology

Route	GJ/tonne of Aluminium
Primary route (bauxite smelting)	58
Secondary route (using recycled scrap)	0.45

Source: ACT

Table 17. Electricity consumption in iron and steel sector per tonne of production by technology

Technology	GJ/tonne of Steel
BF-BOF*	0.39
DRI-EAF	2.42
Scrap-EAF	2.07

* Bear in mind that there can be up to 20% scrap on this route.

Source: JRC

To calculate indirect emissions, the electricity consumption values are multiplied by the grid intensity factor specific to each country and weighted by the share of technology used (or the percentage of scrap utilised). For primary products, this yields the indirect emissions per tonne. For sub-products, the same methodology is applied as for direct emissions, ensuring consistency across the calculation process.

Products from new sectors: organic chemicals, polymers, refinery products

Determining the emissions intensities of chemicals is notoriously challenging, primarily due to the complexity of value chains, simultaneous production of different chemicals and lack of publicly available data. The chemical industry varies also with regions mainly due to the availability of certain types of feedstocks. For example, chemical production from coal is more common in China and South Africa, while natural gas is becoming more common in the US due to increased availability of shale gas.[50]

We have mapped the EI of key chemicals, upstream refinery products, and downstream polymers to the list of goods traded. Due to the lack of available

50 Basic Chemicals Background Paper, The Basic Chemicals Eligibility Criteria of the Climate Bonds Standard & Certification Scheme

country-specific data, we have used assumptions to estimate the EI of traded goods where necessary. In cases where the CN code refers to a group of polymers for example, EI of a representative polymer in this group has been used, with justification.

Refinery products

The 17 finished products of Concawe's linear programming model were distributed to 9 main categories (LPG, Naphtha, Gasoline, Kerosene, Diesel, HO Marine DSL, DMF RMF 0.5%S, HSFO). The EU averages used were the results of the modelling performed in the Concawe study calculating the emissions associated with the refining step of the production process (excluding upstream and downstream emissions). The non-EU EIs for all refinery products were estimated based on the ratio between the EU average (Concawe) and global average[51] EI of naphtha.

Chemicals

The emissions intensities used for the EU are the weighted average GHG emissions intensity of chemicals produced by all EU installations in 2016/2017, as reported in the EU benchmarking.[52] The values include all production-related direct emissions (the process direct emissions and the emissions due to fuel use for energy production), as well as the embedded emissions of the fossil feedstock.

Emissions associated with steam cracking products in non-EU countries are estimated using the ratios of ethylene EI in different regions, as reported in the IPCC's Emissions Factor Database.[53] The global emissions intensity of methanol was also taken from the IPCC database.

Polymers

The emissions associated with crude oil production have been subtracted from the figures reported in the Eionet study as these emissions lie outside the scope of the ETS. An approximation of the embedded emissions associated with refining and steam cracking to produce the polymer feedstocks are included in the figures, however.

For each polymer, the non-EU EI was estimated using global emissions associated with production of each polymer (estimated by Zheng and Suh, 2019)[54] and production figures reported by Plastic Europe.[55]

The new basis products added for the new sectors' scope are listed below.

51 Eionet, 2021, Greenhouse gas emissions and natural capital implications of plastics (including biobased plastics)

52 European Commission, 2021, Update of benchmark values for the years 2021 – 2025 of phase 4 of the EU ETS. Benchmark curves and key parameters

53 IPCC, 2006 https://www.ipcc-nggip.iges.or.jp/EFDB/find_ef_ft.php

54 Zheng, J., Suh, S. Strategies to reduce the global carbon footprint of plastics. Nat. Clim. Chang. 9, 374–378 (2019). https://doi.org/10.1038/s41558-019-0459-z

55 Plastics Europe, 2022, Plastics – the Facts 2022

Table 18. List of basis products for new sectors scope

Sector	Basis product	CN-8 Code	Product description
Refinery	Naphtha	27101211	Light oils of petroleum or bituminous minerals for undergoing a specific process as defined in Additional Note 5 to chapter 27 (excl. containing biodiesel)
	Gasoline	27101241	Motor spirit, with a lead content <= 0,013 g/l, with a research octane number «RON» of < 95 (excl. containing biodiesel)
	Kerosene	27101921	Jet fuel, kerosene type
	Diesel	27101943	Gas oils of petroleum or bituminous minerals, with a sulphur content of <= 0,001% by weight (excl. containing biodiesel, and for undergoing chemical transformation)
	HO marine DSL	27101962	Fuel oils obtained from bituminous materials, with a sulphur content of <= 0,1% by weight (excl. for undergoing chemical transformation, and containing biodiesel)
	DMF RMF	27101966	Fuel oils obtained from bituminous materials, with a sulphur content of > 0,1% but <= 0,5% by weight (excl. for undergoing chemical transformation, and containing biodiesel)
	LPG	27111211	Propane of a purity of >= 99%, for use as a power or heating fuel, liquefied
Organic chemicals	Ethylene	29012100	Ethylene(2004-2500);Ethylene(1988-1994)
	Propylene	29012200	Propene «propylene»(2004-2500);Propene 'propylene'(1988-1994)
	Butadiene	29012400	Buta-1,3-diene and isoprene(2009-2500);Buta-1,3-diene and isoprene(1988-1993)
	Butene	29010000	Butene «butylene» and isomers thereof(2009-2500);Butene 'butylene' and isomers thereof(1988-1993)
	Benzene	29022000	Benzene
	Toluene	29023000	Toluene
	Xylenes	29024X00	o-Xylene, m-Xylene, p-Xylene, and Mixed xylene isomers
	Styrene	29025000	Styrene
	Vinyl chloride monomer	29032100	Vinyl chloride «chloroethylene»
	Methanol	29051100	Methanol «methyl alcohol»
	Monoethylene glycol	29053100	Ethylene glycol «ethanediol»
	Ethylene oxide	29101000	Oxirane «ethylene oxide»
Polymers	Polyethylene, low density	39011090	Polyethylene with a specific gravity of < 0,94, in primary forms (excl. linear polyethylene)
	Polyethylene, high density	39012090	Polyethylene with a specific gravity of >= 0,94, in primary forms (excl. polyethylene in blocks of irregular shape, lumps, powders, granules, flakes and similar bulk forms, of a specific gravity of >= 0,958 at 23Ã‚Â°C, containing <= 50 mg/kg of aluminium, <= 2 mg/kg of calcium, of chromium, of iron, of nickel and of titanium each and <= 8 mg/kg of vanadium, for the manufacture of chlorosulphonated polyethylene)
	Polypropylene	39021000	Polypropylene, in primary forms
	Polystyrene	39031900	Polystyrene, in primary forms (excl. expansible)
	Polyvinylchloride	39041000	Poly»vinyl chloride», in primary forms, not mixed with any other substances
	Polyethylene terephthalate	39076100	Poly»ethylene terephthalate», in primary forms, having a viscosity number of >= 78 ml/g
	Polyurethane	39095090	Polyurethanes in primary forms (excl. polyurethane of 2,2'-»tert-butylimino»diethanol and 4,4'-methylenedicyclohexyl diisocyanate, in the form of a solution in N,N-dimethylacetamide)

Source: Sandbag, Combined Nomenclature (CN) - Goods categorisation

Calculation of price increase due to the cost pass-through of indirect emissions

If indirect emissions were covered by the CBAM, indirect cost compensation (ICC) would likely be phased out in the EU and the generalised increase in cost for electricity users would mostly be passed through to customers, leading to higher sale prices. So net costs are calculated as:

$$\textit{Net CBAM costs} = \textit{CBAM fees} - \textit{revenues from price effect}$$

To calculate the price increase caused by the end of ICC, we used the following formula:

$$\textit{Price effect} = \textit{pass\_through rate} \times \textit{ICC}$$

where ICC is given by the formula in 6.3.4 and **pass-through rate** is assumed to be **80%**, i.e. the same as was used to estimate the price increase caused by free allocation phaseout in 6.3.4.1.

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sandbag
smarter climate policy
Mundo-b Matogné, Rue d'Edimbourg 26
Ixelles 1050 Brussels, Belgium
www.sandbag.be
Email: contact@sandbag.be

MULTINATIONAL
DEVELOPMENT
POLICY DIALOGUE
KAS BRUSSELS

Konrad-Adenauer-Stiftung, European Office Brussels
Avenue de l' Yser, Ijserlaan 11
1040 Brussels - Belgium

Editor:
Nicole Linsenbold
Programme Manager for Development and Climate Policy
Multinational Development Policy Dialogue (MDPD) Brussels
Konrad-Adenauer-Stiftung e.V.
E-Mail: Nicole.linsenbold@kas.de

Contact:
Dr. Olaf Wientzek
Director
Multinational Development Policy Dialogue (MDPD) Brussels
Konrad-Adenauer-Stiftung e.V.

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