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Delegations will find attached document SWD(2025) 988 final (part 1/2).

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PART 1/2

COMMISSION STAFF WORKING DOCUMENT

IMPACT ASSESSMENT REPORT

Accompanying the document

Proposal for a Regulation of the European Parliament and of the Council

amending Regulation (EU) 2023/956 as regards the extension of its scope to downstream goods and anti-circumvention measures

{COM(2025) 989 final} - {SEC(2025) 989 final} - {SWD(2025) 987 final} -
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Glossary

Term or acronym	*Meaning or definition*
Basic good	Good to which CBAM currently applies (listed in Annex I of the CBAM Regulation)
BF-BOF	Blast-furnace/basic-oxygen-furnace
CBAM Regulation	Regulation (EU) 2023/956
CN	Combined Nomenclature, 8-digit trade codes for goods set out in Regulation (EEC) No 2658/87 (https://eur-lex.europa.eu/eli/reg/1987/2658)
CO2	Carbon Dioxide
DRI	Direct-reduced iron
EAF	Electric-arc-furnace
Downstream good	Good incorporating one or several basic goods as inputs and which are thereby down the value chain of one or several of the goods listed in Annex I of the CBAM Regulation
Downstream leakage	Carbon leakage induced in sectors downstream of basic goods
EU ETS	EU Emissions Trading System, which is the Union's carbon market that requires polluters to pay for their greenhouse gas emissions
GDP	Gross Domestic Product
GHG	Greenhouse Gas
LDC	Least Developed Country
MRV	Monitoring, Reporting and Verification
NCA	National Competent Authority
NDC	Nationally Determined Contribution
PEF	Product Environmental Footprint
Polluter pays principle	Environmental policy principle under EU law which requires that those responsible for environmental

	damage bear the costs for preventing, controlling and remedying that damage
PPA	Power Purchase Agreement
Prodcom	Production Communautaire which is the EU's statistical system tracking the production of manufactured goods by enterprises in EU countries
SDG	Sustainable Development Goal
SMEs	Small and Medium-sized Enterprises
TFEU	Treaty on the Functioning of the European Union
WTO	World Trade Organization

1 INTRODUCTION: POLITICAL AND LEGAL CONTEXT

The Regulation establishing the Carbon Border Adjustment Mechanism (CBAM) was adopted on 10 May 2023 by the European Parliament and the Council[1], and came into force on 1 October 2023. It is a key instrument to ensure that the EU's increased climate ambition is not undermined by carbon leakage, which could occur when companies based in the EU move the production of carbon-intensive goods in countries with less stringent climate policies, or when EU products are replaced by more carbon-intensive imports. CBAM aims to ensure that imports are subject to a carbon price equivalent to that faced by domestic producers under the EU Emissions Trading System (EU ETS)[2]. Like the EU ETS, CBAM ensures that the cost of pollution is borne by those who cause it. It also supports industry's clean transition by providing a stable and secure policy framework for investments in low or zero carbon technologies. A key aim of CBAM is to help secure a global level playing field with respect to carbon pricing. As highlighted in the President's 2025 State of the Union address, this is crucial for industry's continued decarbonisation efforts[3]. CBAM plays a key role in this context by helping curb greenhouse gas (GHG) emissions beyond the EU's borders, encouraging foreign exporters to the EU to decarbonise their production and third countries to implement or strengthen their own carbon pricing systems as CBAM deducts the carbon price effectively paid in the country of origin.

CBAM currently applies to imports of selected goods listed in Annex I to the CBAM Regulation. These are organised into six broad sectors, namely aluminium, cement, electricity, fertilisers, hydrogen, and iron and steel. They were selected on the basis of their relevance in terms of cumulated GHG emissions under the EU ETS; the risk of carbon leakage in the corresponding EU ETS sectors; and the need to limit complexity and administrative burden on the operators concerned. CBAM has been introduced in two stages. A transitional period, which started on 1 October 2023 and will run until the end of 2025; and a definitive period starting in 2026. During the transitional period, importers have had to report both direct and indirect emissions embedded in their CBAM goods without paying a financial adjustment[4]. From January 2026 onwards, the system will move beyond reporting requirements and introduce a financial obligation for the embedded emissions of their imports. Importers will then need to purchase and declare CBAM certificates, equivalent to the carbon price that applies in the EU ETS, based on either the verified actual embedded emissions or on default values[5] (for more detail see Annex 10). The CBAM charge will gradually be phased in, reaching 100% of the EU ETS carbon price in 2034, while the corresponding EU ETS free allocations are phased out.

From the outset, CBAM was conceived as a mechanism with the possibility of future scope extensions. That is why Article 30(3) of the CBAM Regulation requires the Commission

[1] Regulation (EU) 2023/956 of 10 May 2023 establishing a carbon border adjustment mechanism.

[2] Directive (EU) 2018/410 of 14 March 2018 amending Directive 2003/87/EC to enhance cost-effective emission reductions and low-carbon investments, and Decision (EU) 2015/1814.

[3] 2025 State of the Union Address by President von der Leyen of 10 September 2025.

[4] Commission Implementing Regulation (EU) 2023/1773 of 17 August 2023 laying down the rules for the Regulation (EU) 2023/956 as regards reporting obligations of the carbon border adjustment mechanism during the transitional period.

[5] Under Regulation (EU) 2025/2083 of the European Parliament and of the Council of 8 October 2025 amending Regulation (EU) 2023/956 as regards simplifying and strengthening the carbon border adjustment mechanism, payment would still accrue in 2026 but only be due from 2027.

to identify products further down the value chain of the goods listed in Annex I to which the CBAM should potentially also apply. This identification should be based on criteria analogous to the ones that guided the original definition of the CBAM scope. Based on these findings, and if deemed appropriate, the Commission is required to present a legislative proposal to extend the scope of the CBAM to such downstream goods by the end of the transitional period. On 19 March 2025, the Commission in the European Steel and Metals Action Plan[6] confirmed a legislative proposal by Q4 2025 regarding an extension of the scope of CBAM to certain steel and aluminium-intensive downstream products. The focus is on the products downstream of steel and aluminium basic materials as these make up most of the goods covered by CBAM in terms of numbers, value and volume while representing most emissions.

At the same time, to ensure compliance with the EU's international commitments, parallelism between the ETS and CBAM must be maintained. The application of the carbon price to downstream products should be limited to those emissions that would be covered under the EU ETS, if the good were produced in the EU

The Steel and Metals Action Plan also announced that the Commission will, by Q4 2025, come with a legislative proposal that will include additional anti-circumvention measures. These are necessary to safeguard CBAM's environmental integrity as without them, and faced with a persistent carbon price gap, some importers and third country producers may try to bypass the rules to avoid paying the CBAM financial adjustment without a genuine reduction in GHG emissions. Circumvention practices could therefore limit incentives for firms to cut their carbon footprint and weaken CBAM as a measure to address the risk of carbon leakage.

Decarbonising the electricity sector is particularly important given that it is the single largest emitter of GHGs under the EU ETS and accounted for 49% of the emissions covered by the system in 2023[7]. Due to the absence of free allocation for electricity generators, the carbon price is fully reflected in the current EU electricity price, increasing the risk of carbon leakage through electricity imports. The inclusion of electricity within the scope of CBAM therefore intends to ensure coherence with the EU ETS by imposing on imports an equivalent carbon price paid by EU electricity producers. However, implementation experience and stakeholder feedback during the CBAM transitional period, including through a public consultation[8], have demonstrated that rules for electricity might be overly rigid, not accurately reflecting the carbon content of imported electricity and thus providing limited decarbonisation incentives for operators.

The proposed revision of the CBAM Regulation, supported by this impact assessment, forms part of a broader effort to strengthen CBAM's effectiveness in reducing carbon leakage and encouraging decarbonisation in a feasible and cost-effective way. Part of that same effort was the recent revision of the CBAM Regulation as regards simplifying and strengthening the CBAM[9]. The rules introduce a new 'de minimis' exemption from CBAM

[6] Communication on A European Steel and Metals Action Plan, COM(2025) 125.

[7] Weitzel, M. and Van Der Vorst, C., Uneven progress in reducing emissions in the EU ETS, European Commission, Seville, 2024, JRC138215.

[8] See Annex 2.

[9] Regulation (EU) 2025/2083 of the European Parliament and of the Council of 8 October 2025 amending Regulation (EU) 2023/956 as regards simplifying and strengthening the carbon border adjustment mechanism

obligations for importers whose annual imports do not exceed a single mass-based threshold of 50 tonnes per year. The revision contains several other simplification measures for all importers of CBAM goods above the threshold, including the exclusion of emissions related to the finishing or downstream manufacturing processes from the CBAM's scope.

The present initiative complements several other recent EU policy developments. In addition to proposing to address the risks of downstream carbon leakage and circumvention, the Steel and Metals Action Plan also notes that CBAM does not deal with the possible carbon leakage risks for metals produced in the EU that are subject to the EU ETS price, and which are exported to third countries with lower climate ambitions. For this reason, the European Commission announced on 2 July 2025 that it will make a separate proposal by the end of 2025 to address the risk of such carbon leakage. The proposed initiative is part of the Clean Industrial Deal[10] and aligns with the objectives of the upcoming Industrial Accelerator Act (IAA)[11].

The proposal contributes to the United Nations' sustainable development goals (SDGs), promoting climate action (SDG13), responsible consumption and production (SDG12), industry, innovation and infrastructure (SDG9), and affordable and clean energy (SDG7) by strengthening CBAM's environmental integrity and promoting investments in low-carbon production, while aiming to keep administrative complexities to a minimum.

The Commission is conducting a broad review of CBAM in line with Article 30(2) of the CBAM Regulation. This review takes stock of how the mechanism has worked so far, assesses relations with and impacts on developing countries including least developed countries (LDCs)[12], and looks ahead to its future development. The review covers the possibility to extend CBAM to other EU ETS sectors at risk of carbon leakage, as well as downstream goods of other sectors in scope (cement, fertilisers and hydrogen)[13]. The European Commission is, in parallel, preparing the adoption of a series of implementing and delegated acts that will lay out the technical rules for the functioning of CBAM in its current scope[14]. These acts relate to implementation modalities of CBAM and as such have no bearing on the methodological choices and analysis under the present impact assessment. At the same time, the final decisions on the revision of the CBAM Regulation supported by this impact assessment will require adjustments to the implementing act on monitoring, calculation and verification of embedded emissions for goods to ensure proper accounting of emissions of the goods newly introduced in the scope.

[10] Communication on the Clean Industrial Deal: A joint roadmap for competitiveness and decarbonisation, COM(2025) 85 final.

[11] See: https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/14505-Industrial-Decarbonisation-Accelerator-Act-speeding-up-decarbonisation_en

[12] This assessment will detail the impacts of the current CBAM scope on a more granular set of countries. The present impact assessment also looks at impacts to third countries in Section 6.

[13] Downstream products of electricity are not considered given that electricity is used in the production process of virtually all goods, rendering the determination of the input share and embedded emissions of electricity in all possible imported goods unfeasible.

[14] Key aspects addressed include rules for the monitoring, calculation and verification of embedded emissions for goods under the scope of the mechanism, the rules for the adjustment of the CBAM obligation to take into account free allocation levels in the EU ETS sectors covered by CBAM, and the rules for accounting of carbon prices effectively paid in third countries.

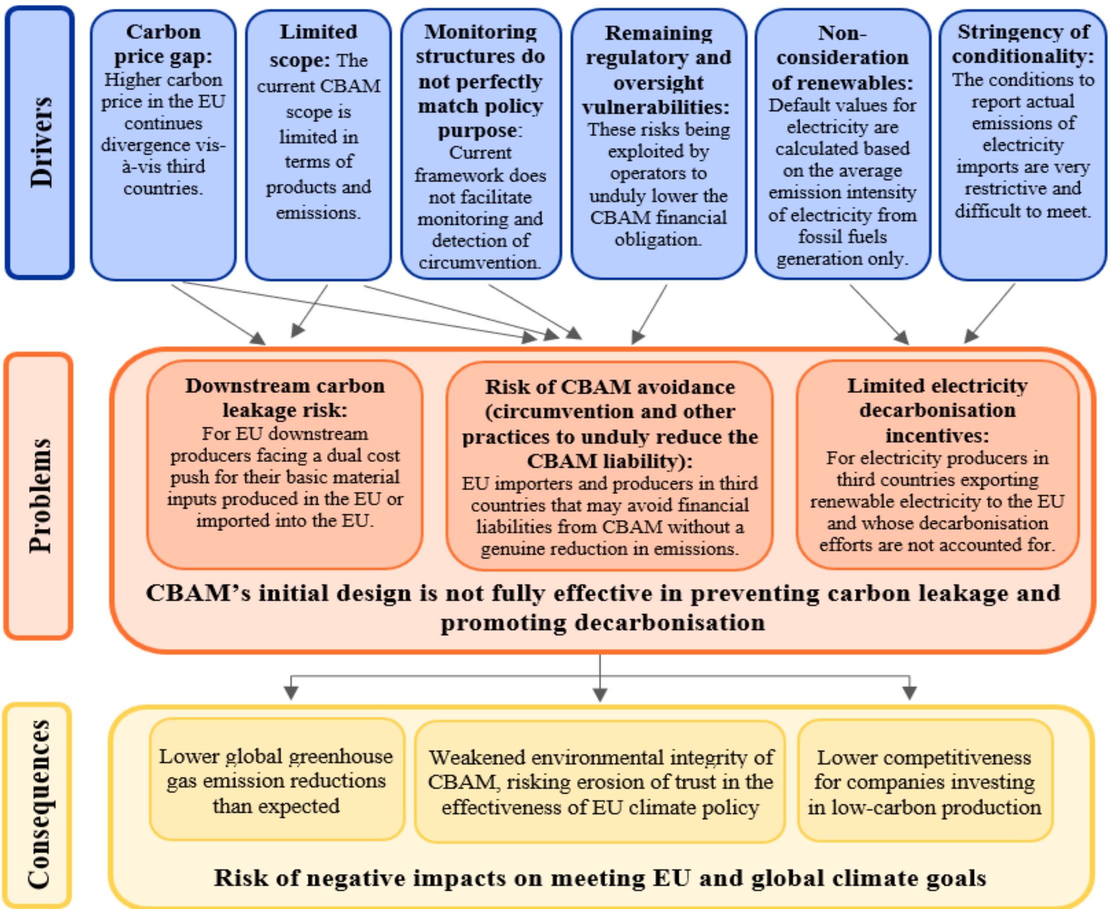
2 PROBLEM DEFINITION

2.1 What are the problems?

The overarching challenge is that the current design of the CBAM is not fully effective in preventing expected carbon leakage and incentivising decarbonisation. To address this, the present impact assessment focuses on three distinct but interconnected problems: downstream carbon leakage risks, the risk of CBAM avoidance (including circumvention and other practices to unduly reduce the CBAM liability), and ineffective treatment of electricity imports. It should be noted that the identified problems have not yet materialised during the transitional phase, as CBAM obligations currently only include reporting requirements. Nonetheless, there is urgency to act now to ensure that the definitive phase starts on a solid footing, with remedies in place to prevent these problems from the outset.

The 'problem tree' (Figure 1) presents visually the causes and consequences of the problems to be addressed by the revision of the CBAM.

Figure 1: Problem tree



2.1.1 Downstream carbon leakage

CBAM is currently limited to a set of imported basic goods listed in Annex I to the CBAM Regulation. Downstream goods incorporate those basic goods as inputs in their production[15]. The limited product scope of CBAM reflects a stepwise approach that initially prioritised basic goods most relevant in terms of their embedded emissions and with the biggest and clearest carbon leakage risks. That design choice was also proportionate since the carbon costs faced by goods further down the value chain were less pronounced compared to the total value added downstream, placing leakage risks primarily on upstream, carbon-intensive sectors.

However, as was recognised even at the time of the CBAM Regulation's adoption, the scope may need to be extended to downstream goods because of higher carbon price levels. This is because carbon costs may then become a more significant share of downstream goods' production expenses, potentially encouraging producers to shift operations to third countries with laxer climate policies or inducing consumers to substitute EU produced downstream goods for carbon-intensive imports that face no carbon cost. This could result in emissions being displaced to third countries, instead of being reduced in line with the EU's ambitions. The analysis conducted under the impact assessment that accompanied the original Commission proposal for a CBAM in 2021 (hereafter the "2021 Impact Assessment") had already looked into this question. It argued that under the levels of carbon price and the modelled estimates about their evolution, at that time, the risk of downstream leakage would be limited on aggregate. Yet with higher carbon prices in the future, more complex products down the value chain would become relevant for potential inclusion in the CBAM.

The case for inclusion of downstream sectors is expected to persist and possibly strengthen over time as the carbon price under the EU ETS increases. As detailed in Section 2.2, current carbon price projections indicate a continued rise of carbon prices under the EU ETS from 2026 onwards in line with the EU's increased climate ambition. With the progressive phase-out of free allowances under the EU ETS and the parallel phase-in of CBAM, downstream producers in the EU may be confronted with a dual cost push. They will face higher input prices for both domestically sourced and imported basic goods, which they require as inputs for the production of downstream goods. As a result, the risk of carbon leakage is likely to shift from the upstream sectors covered by CBAM to later stages of the value chain that remain exposed. This would severely undermine CBAM's climate effectiveness if left unaddressed.

The scale of exposure for downstream producers in the EU is potentially significant.[16] More than 2400 goods defined under the Combined Nomenclature (CN) contain CBAM inputs. About half of these goods is made up of a significant share of CBAM input materials (i.e. 70% CBAM input content or more). Approximately 94% of those 2400 CN goods contains a significant input share of iron, steel, and aluminium. These iron, steel,

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[15] Annex I of the CBAM Regulation already includes very few processed goods that stand further down the value chain such as nuts and bolts produced entirely out of steel, or window frames (95% or more of aluminium).

[16] These figures use the data underlying the supporting downstream study. They are based on basic good inputs of iron & steel, aluminium, and cement (excl. hydrogen, fertilisers and electricity).

and aluminium goods embed approximately 331 Mt of emissions (or 78% of the emissions from all goods with CBAM inputs),[17] EUR 2258 billion of production value (or 97% of the value of all goods with CBAM inputs). The driver for potential carbon leakage in those goods is not their direct but rather their *indirect* exposure to the carbon costs of the carbon-intensive materials they use as inputs. While the degree of risk of carbon leakage varies across these downstream products, the large numbers involved highlight the magnitude of the issue.

Although CBAM is currently still in its transitional phase, ex-ante analyses suggest that domestic climate policies are likely to lead to downstream carbon leakage. According to a recent OECD study, indirect effects from the introduction of CBAM would ripple through non-CBAM sectors downstream, which would experience modest price increases and value-added declines[18]. This concern is equally shared by a broad array of stakeholders whose views were gathered during a public consultation, sectoral dialogues, and exchanges with Member State authorities (see Annex 2).

2.1.2 CBAM avoidance - circumvention and other practices to unduly reduce the CBAM obligation

Stakeholders including national competent authorities (NCAs), customs authorities, business associations, as well as individual companies (see Annex 2) have raised concerns that the CBAM obligation may be avoided, which could undermine the mechanism's environmental integrity. The details of the risks having raised the most concerns from Member States are detailed in Figure 2 through an approach inspired from the one used in standard risk registers, a classic way to represent risks and their scores in risk management[19].

While several measures are already part of the CBAM Regulation to reduce such risks and are discussed in detail in Annex 9.3, some channels to unduly lower the CBAM liability remain (see Section 2.2.2). For this impact assessment, CBAM avoidance comprises circumvention[20] as well as other practices to unduly lower the CBAM financial liability.

[17] Most of the emissions of the goods in the iron, steel, and aluminium sector are induced by iron, steel, and aluminium CBAM inputs. The remaining very small amount of emission is induced by cement input, stemming from 8 CN goods, all of which are related to washing and drying machines.

[18] Dechezleprêtre, A. et al. (2025), "Carbon Border Adjustments: The potential effects of the EU CBAM along the supply chain", *OECD Science, Technology and Industry Working Papers*, No. 2025/02, OECD Publishing, Paris, https://doi.org/10.1787/e8c3d060-en.

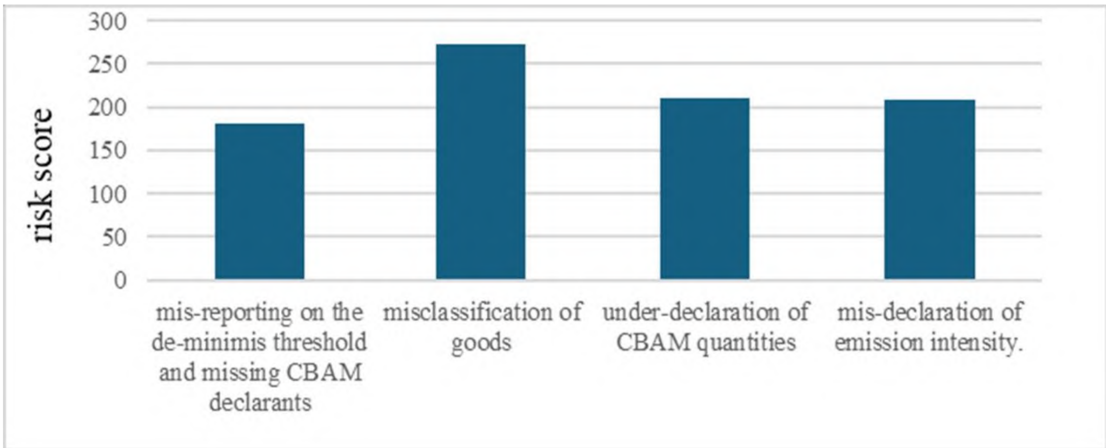
[19] The survey listed key risks identified by DG TAXUD and CBAM stakeholders. For each of these risks, National Competent Authorities and Customs Authorities were requested to assess their likelihood and severity, each with different graduations (from 1 lowest to 5 highest as in the tables below). The guidance provided in the survey defined "likelihood" as the plausibility of a risk materialising, and "severity" as the associated cost or impact. The risk score corresponds to the likelihood multiplied by the severity. For example: should one Member State have answered that the risk is Likely and Not severe, the risk score would be 8. The aggregated risk score, displayed in Figure 2, is therefore the sum of individual risk scores provided by National Competent Authorities and Customs authorities for the given risk. Based on stakeholder input - for example in the survey to Member States and in submissions from the cement industry association - it appears that the risk of mis-declaration of emission intensity is relevant for all CBAM sectors. It can affect for example cement (with the clinker content), fertilisers (with the nitrogen content) or steel (with the alloy content).

[20] The risk of circumvention effectively arises from any practice for which there is insufficient due cause or economic justification, other than to effectively unduly avoid, wholly or partially, the financial adjustments arising from CBAM, weakening the environmental integrity of the mechanism.

Avoidance practices would undermine CBAM's effectiveness. High-emission imports in the EU could face a CBAM financial adjustment that is too low compared to their embedded emissions. This would lead to an increase in imports from third country producers that are relatively carbon-intensive compared to EU producers, hindering a decrease in GHG emissions and weakening decarbonisation incentives across the globe.

There are two key challenges in quantifying CBAM avoidance risks. First, avoidance practices can typically not be directly observed and therefore, quantifications need to rely on circumstantial estimations and approximations. Second, given that CBAM adjustment only applies from 2026 onwards, avoidance strategies are probably not yet being employed by operators. This said, evidence from the transitional period and stakeholder feedback suggest that there are substantial circumvention risks that need to be addressed proactively.

Figure 2: Scoring of selected avoidance risks based on survey with Member States[21]



Source: Commission analysis based on survey of NCAs and customs authorities

The current CBAM enforcement framework allows to tackle several risks[22], including risks of misclassification of goods, under-declaration of CBAM quantities in CBAM declaration, and missing CBAM declarants (i.e., not submitting a CBAM declaration while importing CBAM goods), mis-reporting on the de-minimis thresholds. However, additional/strengthened provisions in the CBAM Regulation are necessary to address the risk of misdeclaration of emission intensities and abusive practices[23]. Several stakeholders

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[21] The risk score is calculated multiplying the risk likelihood (scored 1-5) by the risk severity (scored 1-5).

[22] The CBAM Regulation provides for example: 1) in its Article 15 that the Commission shall carry out risk-based controls on the data and the transactions recorded in the CBAM registry to ensure that there are no irregularities in the purchase, holding, surrender, repurchase and cancellation of CBAM certificates; 2) in its Article 19 that the Commission shall have the oversight role in the review of CBAM declarations. The Commission may also review CBAM declarations, in accordance with a review strategy, including risk factors; 3) In its Article 27 that the Commission shall act in accordance with this Article, based on relevant and objective data, to address practices of circumvention of this Regulation. Moreover, under the Commission's Omnibus simplification proposal, Article 25a strengthens the anti-circumvention framework in relation to the monitoring and enforcement of the new de-minimis threshold. The Annex 9.3 further explains the existing enforcement framework.

[23] It should be noted that the risk of avoidance through imports of downstream products was not included in the survey on risk scoring, as the focus of the survey was on other types of avoidance. Nevertheless, this risk was already explicitly mentioned in the CBAM Regulation (for example in Article 27), and several submissions from stakeholders raise this specific risk as well, for example: the NGO Sandbag

also highlighted these two risks that cannot be tackled with the current enforcement framework: the risk of misdeclaration of emissions intensities is mentioned in particular by the cement industry association. In addition, a limited CBAM emissions scope is creating avoidance risks, as currently goods downstream to the CBAM goods can be imported to the Union without a price on their embedded emissions. Moreover, important precursor emissions (metals scrap) are currently not covered by the CBAM scope.

2.1.3 Limited incentives for electricity decarbonisation

During the transitional phase, it has become clear that the current rules for electricity under CBAM do not fully reflect differences in carbon intensity across imported electricity, limiting the accuracy of the carbon price signal. They fail to credit the progress made by non-EU electricity producers in decarbonising their grids, and they may also hinder the trading of clean electricity between the EU and third countries. Indeed, developments in the electricity sector are not sufficiently considered in the current CBAM Regulation, and in particular the decarbonisation efforts of the electricity generation pursued in third countries. This is due to two interconnected causes.

First, the CBAM Regulation defines the default values for electricity based on the CO2 emission factor of the electricity grid of the country of origin, only reflecting electricity production from fossil fuels. This default value often overestimates the carbon content of electricity from third countries that may export cleaner power to the EU.

Second, although importers can opt to declare actual emissions for electricity, the CBAM Regulation imposes onerous conditions (i.e. five criteria that have to be cumulatively met – see Box 2 below) that have proved very difficult to meet in practice and, in some cases, have been claimed to lack the necessary clarity to be effectively implemented.

Box 2: Conditions for applying actual embedded emissions in imported electricity (as provided under Annex IV, paragraph 5 of the CBAM Regulation)

The five cumulative conditions that are required to be met are listed as follows:

(a) The amount of electricity for which the use of actual embedded emissions is claimed, is covered by a power purchase agreement between the authorised CBAM declarant and a producer of electricity located in a third country;
(b) The installation producing electricity is either directly connected to the Union transmission system or it can be demonstrated that at the time of export there was no physical network congestion at any point in the network between the installation and the Union transmission system;
(c) The installation producing electricity does not emit more than 550 grammes of CO2 of fossil fuel origin per kilowatt-hour of electricity;
(d) The amount of electricity for which the use of actual embedded emissions is claimed has been firmly nominated to the allocated interconnection capacity by all responsible transmission system operators in the country of origin, the country of destination and, if relevant, each

(https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/14748-Carbon-Border-Adjustment-Mechanism-CBAM-downstream-extension-anti-circumvention-and-rules-on-electricity-emissions/F3587992_en), European Aluminium (https://european-aluminium.eu/wp-content/uploads/2025/08/2025-08-20-EA-Comments-to-CBAM-Consultation-on-Downstream-extension-and-anti-circumvention-measures.pdf).

country of transit, and the nominated capacity and the production of electricity by the installation refer to the same period of time, which shall not be longer than one hour;

(e) The fulfilment of the above criteria is certified by an accredited verifier, who shall receive at least monthly interim reports demonstrating how those criteria are fulfilled.

The condition relating to the existence of a PPA has raised, on one hand, doubts as to which types of PPAs should be considered eligible, given the variety of instruments that exist in the electricity market. In addition, the requirement that the PPA has to be a "direct" agreement between the producer of electricity and the CBAM declarant has raised concerns given that it excludes forms of PPAs that occur in practice, such as PPAs contracted through intermediaries.

Additionally, in the case of no direct connection between a power plant in a third country and the Union transmission system, declarants must prove the absence of physical network congestion. While the notion of congestion can be defined in various ways[24] , a standardised methodology to measure and report congestion across all countries of interest does not currently exist. Transmission System Operators (TSOs) may interpret the notion of congestion differently, influenced by factors that include their own operational practices and local grid codes. Moreover, the condition requires that the absence of congestion be proved in relation to the time of import. This implies gathering very granular and time-specific data, adding administrative burden. Availability of such information by all relevant TSOs is also unconfirmed.

Lastly, a further cumulative condition requires a proof of nomination of capacity for the imported electricity for which the actual embedded emissions are claimed. As capacity nominations do not occur for electricity traded under implicit allocation (see Annex 10), this condition prevents the declaration of actual values in this specific case.

During the transitional phase, only around 3% of the CBAM declarations on electricity imports has been based on actual values. In the absence of formal requirements to provide supporting evidence of the conditions being met during the transitional phase, it is possible that this is an over-estimation of the share of electricity imports that could rely on actual emissions in the definitive phase. As a result, it can be expected that in the definitive phase most, if not all, imported electricity will be considered as carbon-intensive by default, discouraging clean electricity trade and providing little incentives for non-EU producers to continue greening their grids.

Electricity is currently exported to the EU from Albania, Bosnia and Herzegovina, Moldova, Montenegro, Morocco, North Macedonia, Serbia, Türkiye, Ukraine and the United Kingdom[25]. Although electricity imports from these countries currently only account for around 1.3% of EU electricity consumption in 2024, the interconnection infrastructure is expected to increase over time whilst the decarbonisation of the electricity

[24] And various definitions of congestion exist in other acts of EU legislation, as noted in Annex 10 (with reference to Regulation (EU) 2015/1222).

[25] ENTSO-E Transparency Platform, https://transparency.entsoe.eu/transmission-domain/physicalFlow/show

grid in exporting countries is expected to progress[26]. First, the North Africa region is emerging as a key region for renewable growth, given the high potential for solar and wind power combined with a decreasing cost of those two technologies[27]. Supporting clean energy generation and facilitating renewable energy trade with Southern Mediterranean is an EU priority (see Annex 10).

Additionally, in the Balkans, where countries account for more than half of the total electricity exports to the EU, recent policy developments reflect a growing commitment to decarbonising the electricity grid. In certain countries, such as the UK or Albania, electricity produced from renewables constitutes a sizeable share of the overall electricity production[28]. In the light of these developments in neighbouring regions, it is essential that the CBAM aligns with prevailing decarbonisation trends and that it sends clear, consistent signals by reflecting third countries' efforts to accelerate the decarbonisation of their electricity systems.

2.2 What are the problem drivers?

2.2.1 Drivers for downstream carbon leakage

There are two main drivers that may induce downstream carbon leakage. First, the increased climate ambition of the EU, which is not always matched by trading partners, resulting in a persistent carbon cost gap faced by downstream producers in the EU compared to producers in third countries. Second, the limited scope of the CBAM that covers only basic goods, whereby the embedded emissions of basic material inputs of imported downstream goods do not face a carbon cost at the border. Overall, these combined drivers would incentivise downstream producers in the EU to relocate to countries with less ambitious climate policies and could result EU production to be replaced by more carbon-intensive imported goods. This would displace emissions instead of reducing them globally, thereby undermining the EU's decarbonisation efforts.

2.2.1.1 Persistent carbon cost gap between the EU and third countries

EU carbon prices have grown significantly since the launch of the European Green Deal. At the time of the 2021 Impact Assessment, the modelled carbon prices for 2025 and 2030 were EUR 35 and EUR 48 respectively in 2015 prices. In 2025 prices, that is around EUR 45 and EUR 60 for 2025 and 2030. Today ETS futures prices stand already at the level modelled for 2030, at slightly over EUR 83[29]. With the progressive phase out of ETS free allowances, the effective carbon price incurred by CBAM-sectors increases further. This contrasts with carbon price developments in the rest of the world. Globally, 43% of emissions from the industry sector, a proxy for CBAM-relevant emissions, are now subject

[26] ENTSO-E, TYNDP 2024 Projects Sheets, https://www.entsoe.eu/outlooks/tyndp/2024/

[27] For instance through the GREGY interconnector between Egypt and Greece or from Tunisia to Italy via ELMED interconnector, see Annex 10.

[28] International Energy Agency, 'Countries & Regions', https://www.iea.org/countries/united-kingdom/electricity, https://www.iea.org/countries/albania/electricity

[29] See: EUA Futures Pricing, Update of December 2025

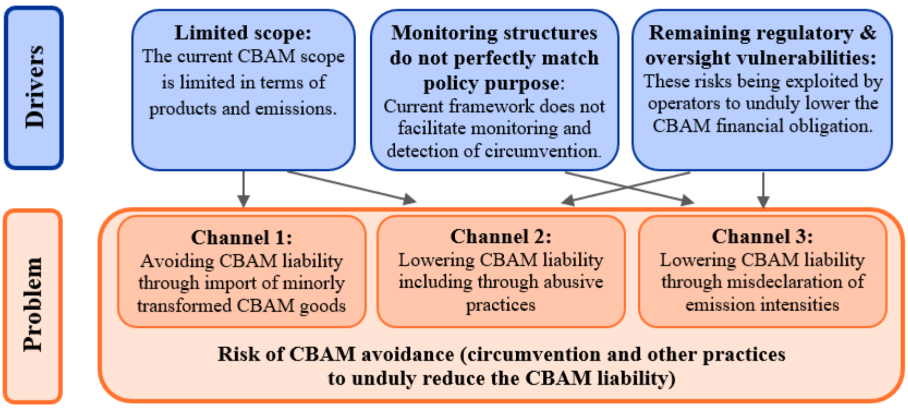
to an explicit carbon pricing instrument (ETS or carbon tax)[30]. However, this figure includes the countries covered by the EU ETS and Switzerland, which will not be subject to CBAM. In third countries, despite promising developments in many countries towards the introduction of carbon pricing, effective carbon prices continue to be very low. According to the latest available OECD data, the average[31] explicit carbon price for industry is EUR 2.84[32]. This figure does not account for free allocation under emissions trading systems, which would drive down the carbon price effectively paid further[33]. This carbon price gap makes it more attractive to produce and import carbon-intensive downstream products from outside the EU, increasing the risk of carbon leakage[34].

2.2.1.2 CBAM's current scope is primarily limited to basic goods

CBAM is currently limited to a specific set of basic goods. This narrow scope means that downstream producers in the EU may have to face the higher carbon cost of basic goods used as inputs, while similar products produced abroad (and potentially with higher embedded emissions) can be imported into the EU without facing a carbon price. The cost push from basic materials is passed on automatically to EU downstream producers, while this is not the case for third country downstream producers whose inputs are produced outside the EU ETS. This means that as long as CBAM does not cover the downstream goods themselves, no equivalent carbon cost for imports is paid at the border, leaving the embedded emissions of the basic material inputs in downstream goods unpriced.

2.2.2 Drivers for CBAM avoidance

Figure 3: CBAM avoidance channels and drivers



[30] World Bank. 2025. State and Trends of Carbon Pricing 2025. Washington, DC: World Bank. DOI: 10.1596/978-1-4648-2255-1.

[31] Simple average across the 49 third countries for which the OECD has data, expressed in 2023 prices

[32] OECD (2024), *Pricing Greenhouse Gas Emissions 2024: Gearing Up to Bring Emissions Down*, OECD Series on Carbon Pricing and Energy Taxation, OECD Publishing, Paris

[33] 84% of industrial emission allowances under the emissions trading systems that were operational in 2021 were allocated free of charge (OECD, Effective Carbon Rates 2023, ibid). While free allocation also brings down the carbon price effectively paid by EU producers, the EU has accelerated the phase out of free allocation for CBAM sectors.

[34] For each downstream good, the risk of carbon leakage depends, in addition to the dual cost push, on the value added generated in downstream production steps. This is discussed in more detail in Section 5.

As explained in the Annex 9.3, the CBAM Regulation already addresses a number of avoidance strategies. However, several risks, which are covered by the proposed initiative, were not addressed at the time of the initial CBAM proposal, largely due to a lack of data and lack of experience with such a novel instrument. For example, the risk of minor manipulations to a product to avoid the CBAM liability was identified as a potential issue and led to a requirement for the Commission to examine the need for a downstream extension by the end of the transitional period.

Regarding misdeclaration, while it is indeed a common risk from a customs' perspective and the current CBAM enforcement allows to address those common risks of mis-declaration (such as mis-declaration of goods, origins, or quantities), the risk of misdeclaration of emissions is a novel risk, not relevant for traditional customs task, which was not identified at the time of the initial CBAM proposal due to two reasons:

- The necessary data on emissions intensity was not available, whereas today data collected during the transitional period and information received from stakeholders (e.g. on cement) show that embedded emissions of goods can vary widely within a given CN code, depending on composition of the goods.
- The difficulty of tracing the supply chain of imported goods became concrete only after work to design the CBAM Registry for the post-2025 had progressed well (see Annex 9.2 of the Impact Assessment).

While the current CBAM enforcement framework addresses several forms of avoidance, the lessons learnt from the transitional period that are discussed in Annex 9.4 and stakeholder inputs led to the identification of three channels to avoid the CBAM liability, which currently cannot be (fully) tackled within the existing legal framework (see Figure 7). While the limited emissions scope is relevant only to the aluminium and steel industries, the other two problems drivers are relevant for all CBAM sectors, notably cement and fertilisers sectors. The carbon price gap is relevant across channels as that makes it financially attractive to avoid CBAM.

2.2.2.1 Limited scope

The current scope of CBAM allows for two avoidance strategies:

a. Replacing CBAM goods with minorly transformed goods to avoid the CBAM liability

Companies may avoid the CBAM by making minor transformations to the CBAM basic goods outside the EU and then importing the slightly altered downstream products into the EU. As long as the CBAM scope is limited to emissions embedded in CBAM basic goods used as inputs in the production of downstream products, the CBAM adjustment can be legally avoided. Therefore, addressing the problem drivers identified in Section 2.2.1 related to downstream carbon leakage will also help closing down a major avoidance channel.

b. Lowering embedded emissions by use of non-CBAM input– the "scrap loophole"

Steel and aluminium scrap are not considered CBAM precursors in the current framework. Scrap consists of recyclable materials left over from product manufacturing and consumption. Unlike waste, scrap can have a material monetary value, closely correlated with primary metal prices[35]. In fact, scrap can be used in the input process composition, with different calibration possibilities, as a partial substitute to primary input material such as iron ore or alumina. Since scrap is not listed as a precursor to CBAM good, it is not possible for the CBAM methodology to attribute emissions to this input as the CBAM methodology can attribute emissions only to precursors, which are defined as inputs included in the CBAM scope. Therefore, scrap is currently assigned zero emissions in the CBAM methodology when used as input to produce other CBAM goods.

While the current approach was based on the initial consideration that the manufacturing processes where it occurs (pre-consumer scrap) are typically outside the ETS scope (similarly to downstream products), two elements should be taken into account: first, while scrap production is not included in the EU ETS scope, EU installations pay a price for the emissions linked to the remelting and refining of aluminium scrap, and linked to the secondary production of steel from scrap. Moreover, EU installations pay a carbon price indirectly through the supply chain[36]. Analogously to downstream goods carbon costs have been attributed to the primary metals when those were produced and have been passed through further down the supply chain, including the secondary metals producers purchasing the scrap. This is not the case for the scrap resulting from aluminium/steel production in third countries. Second, any comparison between the EU ETS scope and CBAM scope should consider that the EU ETS measures emissions at installation level, while CBAM attributes emissions to products imported into the EU. Therefore, no emissions are considered from precursors in the EU ETS, including scrap (though if the scrap was produced in the EU, its embedded emissions would already have been accounted for). However, since the CBAM attributes emissions to products, all relevant precursors should be considered to calculate the corresponding emissions. Since scrap is an important precursor, its current exclusion from the scope of CBAM is not justified, and it creates a regulatory vulnerability that can be exploited to unduly lower the CBAM liability, as explained below.

The current approach to scrap bears high risks as imported goods using pre-consumer aluminium and pre-consumer steel scrap as input material are subject to a lower carbon price compared to goods produced in the EU, thus weakening the effectiveness of the CBAM in addressing the risk of carbon leakage. While the use of pre-consumer scrap as a precursor in imported CBAM goods leads to a carbon leakage risk, pre-consumer scrap is not considered at risk of carbon leakage in its own right since it is only a by-product, meaning a secondary product derived from a production process put in place for a different purpose. Several stakeholders stressed the issue of the "scrap loophole" in the context of the consultation strategy. Several NCAs and other authorities mentioned it as a risk. This is consistent with the result of the public consultation. Businesses also extensively

[35] Value of scrap was as follows: approximately EUR 1600 per tonne at end of July 2025 for aluminium (source: https://www.metaloop.com/scrap-metal-price/aluminium/), in the range of EUR 300- EUR 400 per tonne for ferrous scrap at end of July 2025, the exact price depending on the type of ferrous scrap (source: https://www.lme.com/Metals/Ferrous), and up to EUR 1500 for stainless steel scrap (source: https://www.metaloop.com/scrap-metal-price/stainless-steel/).

[36] Pre-consumer scrap produced in the EU faces a carbon price indirectly through the supply chain. Since pre-consumer aluminium and pre-consumer steel scrap are assigned zero-emissions, imported goods using pre-consumer aluminium and pre-consumer steel scrap as input material are subject to a lower carbon price compared to goods produced in the EU, thus weakening the effectiveness of the CBAM in addressing the risk of carbon leakage of good listed in Annex I.

highlighted the scrap loophole. European Aluminium has notably published a study on the topic[37]. Several individual businesses have publicly shared their position on the matter such as Hydro[38] or Alcoa[39]. Other industry players also stressed the scrap loophole.

2.2.2.2 Monitoring framework does not perfectly match the policy purpose

The risk of mis-declaration of emission intensity is partly driven by the fact that the CBAM relies in parts on a monitoring framework, which was conceived for different policy purposes, that is, the monitoring and enforcement of customs duties. Therefore, currently, the CBAM methodology and CBAM declarations have to rely on CN codes conceived for the aforementioned policy purpose. However, the embedded emissions of goods can vary widely within a given CN code, depending on the quality required for the goods, which is linked to its composition. Therefore, an importer could import a product which is highly emission-intensive (i.e., with a high clinker content for cement), and later submit a CBAM declaration for this import, correctly using the same CN code but declaring low emissions (i.e. corresponding to a lower clinker content), resulting in a lower CBAM adjustment to be paid. The wide variation of actual embedded emissions within a given CN code, and even within a given installation, indicates that this risk of mis-declaring emission intensities is likely to be material, leading to a significant loss of declared emissions and corresponding financial adjustment, weakening CBAM's environmental integrity.

The wide variation in actual emissions can be evidenced from declarations in the CBAM transitional registry (see Annex 9.1 for detailed summary of the statistical analysis performed). Such analysis was not possible in the 2021 Impact Assessment, as data on actual emissions became available only during the transitional period. This risk of circumvention cannot be addressed by the accredited verifiers since a given installation in a third country can produce different grades of the same product (e.g., different cement/fertilisers/steel grades, see examples in Annex 9.1). Even tough an accredited verifier would check the embedded CO2 in a given installation in coherence with the verification requirements, it is possible that the installation exports to the EU highly emission-intensive products, while the CBAM adjustment for the importers would be based on an actual value for emissions, which is too low compared to the carbon footprint of the product exported. NCAs and Customs Authorities conveyed their concern over this point as well as over 70% of 142 circumvention stakeholders in the context of the consultation available in Figure 15, Annex 2.

2.2.2.3 Remaining regulatory and oversight vulnerabilities

The use of actual emissions remains the central pillar of CBAM, yet it also entails potential risks. The current regulatory and oversight framework is not agile enough to react to newly developed avoidance strategies to exploit regulatory vulnerabilities and therefore needs

[37] European Aluminium, Third party study on impact of CBAM on alumina and scrap markets, by Ramboll, March 2025.

[38] Hydro, CBAM: Europe's low-carbon aluminium is threatened by a big loophole, https://www.hydro.com/en/global/about-hydro/stories-by-hydro/greenwashing-via-cbam-loophole s-threaten-european-green-products-market/ April 2025? https://www.hydro.com/en/global/about-hydro/stories-by-hydro/greenwashing-via-cbam-loophole s-threaten-european-green-products-market/

[39] Sandbag, Closing the CBAM scrap loophole – A critical move for climate , July 2024

further reinforcement. This is coupled with the fact that the CBAM is the first of its kind, and thus, there is little experience to draw on.

A first challenge in this respect is the use of actual emissions combined with a lack of traceability. The difficulty in tracing the supply chain of imported goods, a general issue for imports going beyond CBAM, combined with the use of actual emissions in CBAM, can lead to schemes where CBAM declarants mis-declare the emission intensity to decrease the financial adjustment, while importing relatively high-emission products. When submitting a CBAM declaration, authorised CBAM declarants indicate the quantity of goods imported per installation in third countries, as well as information on the embedded emissions. However, within the current framework, it is not possible to ascertain that the declarant has correctly assigned the imported volumes to the correct installation that produced the good (see Annex 9.2). Such mis-declaration of emission intensities would be difficult to detect due to the lack of traceability.

A second challenge relates to abusive practices that could occur when actors exploit the possibility of using actual emissions for the purpose of unduly avoiding, wholly or partially, the CBAM financial liability. Such practices would undermine the effectiveness of the CBAM in addressing the risk of carbon leakage in the Union and the attainment of the Union's climate policy objectives. The novelty of the CBAM particularly exposes it to such practices as fast-evolving schemes could emerge.

2.2.3 Electricity

Transparent and applicable rules for electricity as a CBAM good must ensure the environmental integrity of the mechanism, while acknowledging the energy transition pursued in countries exporting electricity.

2.2.3.1 Emission factor for electricity

Unlike for the rest of CBAM goods, the main rule for calculating the emissions of electricity is the use of default values. The default values are set as the CO2 emission factor of the exporting countries of electricity, to reflect the CO2 intensity of electricity produced from fossil fuels. A default value based on the CO2 intensity of the fossil fuel electricity plants constitutes a proxy for the price-setting sources in the country of origin. This approach aimed at ensuring an equivalent carbon price of electricity imports and EU electricity production, considering the EU's price-setting system for electricity based on the marginal plant. However, whilst this is still the case in the majority of cases[40 41 42], the modelled continued rise of carbon prices under the EU ETS is providing the favourable economic conditions for a substitution of the most polluting technologies with renewable sources.

40 JRC (2023), The Merit Order and Price-Setting Dynamics in European Electricity Markets, A 2022 and 2030 Investigation using METIS (https://publications.jrc.ec.europa.eu/repository/handle/JRC134300)
41 UCL (2022), The Role of Natural Gas in Electricity Prices in Europe (https://www.ucl.ac.uk/bartlett/sustainable/sites/bartlett_sustainable/files/ucl_isr_necc_wp1_with_cover_final_060922.pdf)
42 Eike Blume-Werry et al (2021). Eyes on the Price: Which Power Generation Technologies Set the Market Price? Economics of Energy & Environmental Policy, Vol. 10, No. 1 (https://neon.energy/Blume-Werry-Faber-Hirth-Huber-Everts-2021-Eye-on-the-price.pdf)

The CO2 emission factor does not reflect the emission intensity of the entire electricity mix in third countries. For example, an increased share of renewable energy sources in the electricity mix of a third country would not automatically result in a lower CO2 emission factor and thus a lower CBAM liability. The CO2 emission factor only decreases when the emission intensity of fossil fuel power plants decreases. This could, for example, result from a shift from coal to natural gas as an energy source or from efficiency improvements in fossil fuel power plants. Still, a switch to renewable electricity sources might have an indirect effect on the CO2 emission factor, as a higher share of renewables often requires a shift from baseload coal to more flexible natural gas power plants. Nevertheless, the fundamental criticism remains that the decarbonisation of third countries' electricity grids has a limited effect on the CBAM liability. This needs to be assessed against the CBAM objective to prevent carbon leakage by ensuring equivalent carbon costs of domestic and imported electricity.

2.2.3.2 Stringency of conditionality

Annex IV paragraph 5 of the CBAM Regulation provides specific and cumulative conditions to be met for the declaration of actual values for the import of electricity from third countries[43]. However, stakeholders' views collected through sectoral dialogues, exchanges with Member States, studies and a public consultation (see Annex 2) highlighted difficulties for importers to meet those cumulative criteria and the necessity for additional clarification. In particular, the conditions regarding (i) the electricity covered by a power purchase agreement (PPA), (ii) the absence of physical network congestion and (iii) the requirement for the electricity to be firmly nominated to the allocated interconnector were identified as presenting significant compliance challenges.

The public consultation confirmed the necessity to amend those criteria. About 95% of the electricity respondents supported an amendment to the condition regarding PPAs, while 90% were in favour of amending the condition on physical congestion and 65% supported changing the condition on capacity nomination at the interconnector level. The other conditions were identified as less problematic, as 50% of respondents supported a modification to the direction connection and 25% supported an amendment of the threshold on the emission intensity of an electricity installation.

The potential problems with the conditions are detailed below.

(i) The electricity is covered by a PPA

To declare actual values for an electricity import, the declarant must prove that the electricity is covered by a PPA, defined in the CBAM Regulation (Annex IV, point 1(f))

[43] The conditions, which are fully reported in section 2.1.3, can be summarised as follows: (a) existence of a power purchase agreement between the electricity importer and the electricity producer; (b) either direct connection of the electricity producer to the Union transmission system or absence of physical network congestion at the time of export; (c) emission intensity of the imported electricity not higher than 550 grammes of CO2 per kilowatt-hour; (d) the amount of electricity for which the use of actual embedded emissions is claimed has been firmly nominated to the allocated interconnection capacity; (e) the fulfilment of the above criteria is certified by an accredited verifier.

as *"a contract under which a person agrees to purchase electricity directly from an electricity producer"*.

Limited data is available on PPAs which are currently in place between third countries and the EU. Information on their specificities is also limited due to reasons pertaining to the protection of commercial rights. The only mature PPA market is the UK market, with 5.4 GW of contracted PPAs[44]. For the countries of the Energy Community, PPAs are still a nascent form of contract. Only Serbia has several PPAs which are currently underway, amounting to 0.3 GW of contracted capacity[45]. Currently, there is no clear evidence of formal cross-border PPAs between the EU and third countries.

The CBAM Regulation provides a definition of PPAs but does not specify in detail which PPAs are eligible. The has raised doubts among stakeholders whether actual emissions can be claimed in the presence of virtual PPAs. Those PPAs only refer to a financial arrangement between an electricity supplier and a buyer and are not designed to correspond to a physical import of electricity from the specific producer of electricity with whom the agreement is signed. They cannot thus be considered to fall within the definition of PPA. Currently, only direct physical PPAs are recognised for the purpose of reporting actual emissions under the CBAM regulation.

This form of PPA — involving direct physical delivery of power to the buyer across the grid — is relatively uncommon in the market. In practice, the majority of corporate PPAs in the UK and across Europe are structured as sleeved PPAs (facilitated by an intermediary supplier, also called indirect PPAs), while an increasing share are concluded as virtual PPAs (VPPAs)**,** which are purely financial contracts. VPPAs might, however, pose a risk of circumvention, as they are not attached to any physical delivery of electricity, and prevent effective verification. In addition, studies and stakeholder interactions have revealed that regulatory constraints in some countries prevent the use of PPAs that meet the CBAM Regulation's definition. The problems relate in particular to the requirement that the contract must be signed directly with the producer of electricity.

(ii) The absence of physical network congestion at the moment of import

This criterion originally aimed at ensuring that the electricity produced by the designated power plant is the electricity that is effectively imported into the EU and for which actual emissions are claimed.

While different definitions of electricity congestion exist in other EU legislation (see Annex 10), no definition is provided in the CBAM Regulation. However, based on the

[44] Bloomberg NEF - PPA (2025)

[45] Papazoski and Mishev Law Firm (2024) "Renewable Power Purchase Agreements in the Energy Community" (https://www.energy-community.org/news/Energy-Community-News/2024/12/17a.html)

purpose of the condition it is clear that market congestion is not relevant for CBAM purposes and a notion instead relating to physical congestion applies.

Tracing physical congestion, however, is complex, and a standardised methodology to measure and report congestion does not currently exist in the geographical area of interest. As noted in Section 2.1.3, Transmission System Operators (TSO) from different countries may apply different definitions of congestion, influenced by operational practices and local grid codes. This technical reality, adding to the complexity of electricity cross-border trades, represents a significant challenge for electricity importers wanting to declare actual values in CBAM, as they need to demonstrate the absence of physical network congestion at the moment of import. The impossibility for importers to predict, or influence, the occurrence of physical congestion at the time of export has also been raised as a concern.

(iii) The electricity must be firmly nominated to the allocated interconnector

This condition reflects the reality of cross-border electricity trading between two bidding zones which requires a capacity allocation at the interconnector level. Importers must prove that the electricity imported has been firmly nominated to the allocated interconnection capacity. This however only relates to electricity trading that takes place via explicit capacity allocation.

When it comes to the conditions to report actual emissions of electricity, the current CBAM Regulation does not distinguish the case of explicit and implicit allocation. Yet, this condition can solely apply to the case of explicit allocation and consequently may prevent EU importers to declare actual values for electricity imported from a third country where electricity trade is implicitly coupled. At the very least, this could give rise to uncertainties.

Since the criteria listed in the Regulation, including the ones mentioned above, must be complied with cumulatively for electricity importers to be able to declare actual values, clarifying those three rules and making them applicable in practice is key to enabling the proper implementation of CBAM and the attainment of its objectives.

At the moment, implicit capacity allocation is only relevant to electricity traded between the UK and Ireland.

2.3 How likely is the problem to persist?

2.3.1 Downstream

In the absence of targeted policy intervention, the risk of downstream carbon leakage is likely to persist, if not even worsen, in the coming years. This assessment is based on three interconnected developments outlined in Section 2.2: the persistent carbon cost gap between the EU and third countries, the progressive phase-out of free allowances under the EU ETS, and the corresponding gradual phase-in of CBAM. Due to these three factors and using strategic foresight (looking ahead to 2030 and beyond), downstream carbon leakage could occur that may be hard to reverse. Businesses could transfer their production and investments to countries with laxer emission constraints, thus increasing GHG emissions in third countries, or replace carbon-intensive EU products with carbon-intensive imports. As illustrated in Section 6, model estimates confirm that CBAM without the downstream extension can lead to leakage in the downstream sector. A downstream extension of CBAM could substantially reduce this carbon leakage to about half. That is, in absence of action, carbon leakage in downstream sectors could be more than twice as large as with CBAM's downstream extension.

2.3.2 CBAM avoidance - Circumvention and other practices to unduly lower CBAM liability

In absence of an effective policy intervention, the identified avoidance risks cannot be addressed with the current enforcement framework and will likely become more significant. As emphasised above, the carbon costs are expected to persist, if not increase, in the coming years. The higher the expected CBAM charge, the higher the costs from non-detected non-compliance. Moreover, and as indicated in Section 2.2.2.3, with the dynamic environment in which the CBAM is rolled out, and the many unknowns that EU authorities are facing in the first years of operation, it is plausible that additional avoidance risks and strategies materialise that are currently not anticipated.

2.3.3 Electricity

In the absence of an amendment to the Regulation, the problem is unlikely to be solved and is rather likely to be exacerbated in view of further interconnector capacity to be installed in the near future. A CO2 emission factor based solely on fossil fuel sources with overly strict conditions to declare actual values would fail to reflect third countries' efforts to decarbonise their electricity grid and to provide incentives for operators in third countries to reduce emissions, contrary to the objectives of the CBAM and sectoral EU policy objectives.

3 WHY SHOULD THE EU ACT?

3.1 Legal basis

CBAM is based on Article 192(1) Treaty on the Functioning of the European Union ('TFEU'). Said article confers to the European institutions the competence to lay down appropriate provisions to preserve and protect the environment, including measures combatting climate change at global level. It implements the "polluter pays" principles set out in Article 191(2) TFEU. Article 30(3) of the CBAM Regulation sets out that the Commission present a report to the European Parliament and to the Council that identifies downstream products to be considered for inclusion within the scope of this Regulation.

3.2 Subsidiarity: Necessity of EU action

The three problems of downstream carbon leakage, CBAM avoidance and ineffective treatment of electricity imports stem from the incomplete design of the CBAM, which is an EU-level environmental policy tool. CBAM is designed to complement and reinforce the EU ETS, which is itself an EU-wide instrument. The effectiveness of both mechanisms depends on a uniform carbon price signal applied consistently for the relevant sectors across all EU Member States. Action to safeguard CBAM's environmental integrity going forward can thus only be effectively taken at Union level.

3.3 Subsidiarity: Added value of EU action

EU-level action to strengthen and adapt CBAM delivers clear added value compared to uncoordinated national measures or inaction. It ensures that a uniform carbon price continues to be applied consistently throughout the EU, thereby upholding the principle of fair competition between businesses across Member States based on a level playing field. In contrast, national responses to deal with downstream carbon leakage, avoidance risks, and electricity imports would likely exhibit diverging approaches, risk legal uncertainty and could create market distortions, undermining the integrity of the internal market. Furthermore, only coordinated EU-level action can ensure continued coherence between CBAM and the EU ETS as well as sectoral decarbonisation initiatives, such as the Clean Industrial Deal. This integrated approach strengthens the effectiveness of the EU's clean transition framework as a whole. Lastly, EU-level action sends a far stronger and more credible signal to the world than fragmented national measures, affirming that decarbonisation investments and ambitious climate policies are necessary and worthwhile.

4 OBJECTIVES: WHAT IS TO BE ACHIEVED?

4.1 General objectives

The overall objective of the legislative proposal is to strengthen the effectiveness of CBAM, including by addressing the risk of downstream carbon leakage and encouraging decarbonisation in a feasible and cost-effective way, thus reducing GHG emissions and fighting climate change globally.

4.2 Specific objectives

The overarching objective of addressing climate change is further articulated in several specific objectives, namely:

Mitigate the risk of **downstream** carbon leakage:

– Ensuring that at-risk downstream products imported into the EU face a carbon price for the embedded emissions of their CBAM basic material inputs, equal to the applicable EU ETS allowance price, settled via CBAM certificates and reduced by any certified carbon price paid in the country of origin, while keeping the administrative burden for EU importers and third country producers as low as possible.

Strengthen enforcement of the CBAM and deter **avoidance** practices:

– Reducing the risk that CBAM importers and/or third country operators employ practices for which there is insufficient due cause or economic justification, other than to effectively unduly avoid, wholly or partially, the financial liabilities arising from CBAM without a genuine reduction in GHG emissions.

Encourage decarbonisation of **electricity** imports:

– Ensuring that the technical rules for attributing emissions to electricity as a good, both in terms of the applied default values and in relation to the conditionalities for the determination of actual emissions, better reflect the carbon content of imported electricity and thus encourage decarbonisation in third countries.

5 WHAT ARE THE AVAILABLE POLICY OPTIONS?

5.1 What is the baseline from which options are assessed?

This chapter describes the baseline scenario against which all options considered under this impact assessment are assessed[46]. This scenario reflects CBAM as currently legislated, covering basic goods (571 CN codes[47]) under six sectors, including iron and steel, aluminium, cement fertilisers, hydrogen and electricity. For the corresponding sectors in the EU ETS, the baseline foresees the phase-out of free ETS allowances from 2026 to 2034, accompanied by the phase-in of the monetary obligation under CBAM. This phase-out of EU ETS free allowances for the CBAM sectors is implemented against the overall strengthening of the EU ETS in the baseline as reflected in the revision of the EU ETS of 2023 that from part of the Fit for 55.

The baseline also includes the revision adopted under the Omnibus I simplification package. This includes a revised *de minimis* mass-based threshold per importer per year of 50 tonnes of CBAM goods (for four CBAM-good categories) and the simplifications that relate to larger importers notably the exclusion of emissions of finishing or downstream processes (see also Section 5.2.1) .[48]

For electricity, the default values are based on the CO2 emission factor, calculated as the weighted average of the CO2 intensity of electricity produced from fossil fuels within a geographic area and over a 5-year period. During the transitional phase, the Commission provided the default values based on data from the IEA through the CBAM Transitional Registry. To declare actual values, CBAM declarants must comply with the five cumulative criteria provided in Annex IV of the CBAM Regulation as outlined in Section 2.2.

These elements underpinning the CBAM in the baseline are assumed to apply against all other legislated parts of the Fit for 55 package and RePowerEU policies -including as indicated above- against the strengthening of the EU ETS and the phasing out of EU ETS free allowances with the corresponding phasing in of CBAM. These latter assumptions are consistent with corresponding scenarios developed for the EU's 2040 climate targets. In this context the underlying carbon prices that underpin the analysis are set following the 2040 climate target impact assessment.[49] In the quantitative modelling of both the baseline and policy options, these carbon prices adjust endogenously. Hence, the evolution of the carbon prices also reflects the dynamics embedded in both the legislative assumptions (for example, the phasing out of free allowances), as well as the dynamic response of the other variables, like output, emissions, and prices.

[46] The quantitative underpinnings of the baseline scenario are discussed in Section 4.1.3 of Annex 4.
[47] 571 codes based on the 2025 Combined Nomenclature, 569 CN codes based on 2023 Combined Nomenclature when the CBAM Regulation was adopted.
[48] The threshold is based on the mass of CBAM goods imported, and not on their embedded emissions.
[49] Europe's 2040 climate target and path to climate neutrality by 2050 building a sustainable, just and prosperous society, European Commission, SWD(2024)63. See also the discussion in Annex 4.1.3.

As regards the rest of the world, third countries are assumed to follow existing climate policies. With the exception of UK and EFTA countries that are assumed to have climate policy of equal stringency as in the EU, effective carbon prices in other third countries continue to be very low with continued free allocation under emissions trading systems, which drive down the carbon price effectively paid even further.

The above elements are assumed to continue in the absence of a policy intervention, thereby reflecting the dynamic evolution of the baseline into the future. The baseline scenario is inherently dynamic. In the absence of further intervention, the gradual phase-out of free allocations under the EU ETS and the corresponding phase-in of CBAM will increase input cost pass-through in downstream goods not covered by CBAM. In the medium-term, carbon leakage pressures are expected to gradually rise, in particular for highly traded steel- and aluminium-based downstream products. If the carbon cost gap with key trading partners persists and once free allocations are phased out, a larger share of embedded emissions in EU downstream products is likely to become at risk of being displaced rather than reduced. Circumvention behaviour is also likely to adapt and become more sophisticated over time as traders respond to the persistent carbon price gap and as identified CBAM avoidance channels remain unaddressed. Importers of electricity will in all likelihood continue to rely mostly on default values that limit recognition of cleaner imports. Over time this will dampen investment incentives for clean electricity production in neighbouring systems and discourage clean electricity trade between the EU and third countries. In the case of implicit allocation, importers will be prevented from declaring actual values.

5.2 Description of the policy options

5.2.1 Downstream options

5.2.1.1 Design elements common to all downstream options

The downstream policy options focus exclusively on extending CBAM to steel- and aluminium-intensive downstream products[50]. This focus follows directly from Article 30(3) of Regulation 2023/956, and the Steel and Metals Action Plan, which narrows this initial extension to goods downstream to the 'metals sectors' of CBAM. Not only do steel- and aluminium-based downstream products face the highest risk of carbon leakage as detailed in Section 2.1.1, but they exhibit the highest technical feasibility in terms of obtaining actual values for embedded emissions. This is because, on average, the basic CBAM materials account for a relatively large share of both mass and embedded emissions of the relevant downstream goods. Downstream goods of other CBAM sectors, namely those related to cement, fertilisers and hydrogen, are discussed in the Commission's review report set out under Article 30(2) of the CBAM Regulation. An extension to these goods may be considered in a future revision.

The options presented differ only in how broadly the scope of CBAM is extended to downstream products, namely the number of CN codes to be added into the scope of the

[50] A very small number of metals' downstream goods considered as part of the analysis include small shares of other CBAM material, notably cement. For example, the cloth washing and drying machines, of the household type include 5% cement as a share of mass.

mechanism. All other provisions of the CBAM Regulation that detail its practical implementation are assumed to apply equally to all options considered. To maintain the close alignment with the EU ETS, the application of the carbon price to downstream products should be limited to those emissions that would be covered under the EU ETS, if the good were produced in the EU[51]. It should neither apply to the emissions of other materials in a downstream product, which are not covered under the EU ETS, nor to the emissions generated in assembling the downstream good.

All options share a single, transparent selection logic built around a carbon leakage risk filter and a production emission floor (see Annex 4):

- The **carbon leakage risk filter** is applied because the fundamental purpose of extending CBAM to downstream goods is to address the risk of carbon leakage. If a product is not readily traded or sensitive to carbon-related cost increases, downstream carbon leakage is unlikely to occur regardless of its overall climate relevance. The carbon leakage risk filter combines two sub-filters. Firstly, the **cost push** indicator captures how much the carbon cost of CBAM inputs drive a downstream good's overall costs compared to its overall value added. Secondly, **trade intensity[52]** provides a proxy for a downstream good's tradability. Downstream products are deemed at risk of carbon leakage when they have both a high-cost push and high trade intensity. The two filters are well established in the literature[53].

- The **production emission floor** sets a minimum level of EU production emissions at Prodcom code level[54]. This filter is applied to focus on downstream products for which displacement of EU production would have material climate consequences. It mirrors the criteria that determined the original CBAM scope, namely relevance of sectors in terms of EU emissions.

5.2.1.2 Policy options for downstream scope extension of CBAM

The application of the above-mentioned filters allowed for the development of combinations of thresholds that represent different levels of stringency. As a starting point, the exercise draws from the corresponding thresholds applied under the EU ETS[55], adjusted to the context of steel- and aluminium-based downstream goods. A range of alternatives were assessed resulting in three representative options. First, a highly stringent one, which requires very high levels of carbon leakage and a minimum level of EU emissions resulting in a targeted selection of goods. Second, a scenario mirroring the threshold levels under the EU ETS with a minimum level of EU emissions which results

[51] This principle has been introduced in the revision of the CBAM Regulation adopted in October 2025, which excludes from the system boundaries of emissions calculation these emissions generated in the finishing or downstream processes that in the EU are carried out by separate installations typically not covered by the ETS (except for the case of integrated facilities).
[52] Ratio of trade to total consumption in the EU.
[53] Sato, S. & Grubb, M. & Cust, J. & Chan, K. & Korppoo, A. & Ceppi, P., 2007. "Differentiation and dynamics of competitiveness impacts from the EU ETS," Cambridge Working Papers in Economics 0712, Faculty of Economics, University of Cambridge.
[54] The emission floor was applied at the most granular Prodcom level (8-digit). A higher level of aggregation would lead to the inclusion of more codes, as aggregated categories have larger combined emissions.
[55] Primarily the thresholds applied under EUT ETS 3 criteria and indirectly also EU ETS 4.

in a balanced selection of goods. Third, a scenario which still keeps the threshold levels of the EU ETS for carbon leakage but relaxes completely the minimum level of EU emissions thus diverging from the original CBAM criteria, resulting in a broad list of downstream products. An overview of the policy options can be found in Table 1 below.

Table 1: Downstream policy options

	Carbon leakage risk filter			
Policy options	**Trade intensity**	**Cost push**	**EU Emission floor**	**Number of CN codes**[56]
Option 1: **Targeted extension** to only the 'highest risk downstream goods with significant climate relevance'	20%	15%	150Kt CO_2eq.	70-80
	This option applies a higher cut-off for the carbon leakage filter and uses the emission floor, resulting in a narrow list of downstream products to be included in CBAM's scope. The products are centred on those with the highest leakage risk and highest climate relevance.			
Option 2: **Balanced extension** to 'at-risk downstream goods with significant climate relevance'	10%	5%	150Kt CO_2eq	150-180
	This option applies a lower cut-off for the carbon leakage filter and keeps the emission floor, resulting in a moderate list of downstream products to be included in CBAM's scope. The products are centred on those potentially at risk of downstream carbon leakage and with the highest climate relevance.			
Option 3: **Broad extension** to 'all at-risk downstream goods'	10%	5%	None	230-250
	This option applies a lower cut-off for the carbon leakage filter without any emission floor, resulting in a broad list of downstream products to be included in CBAM's scope. The option maximises environmental coverage, capturing all products potentially at risk of downstream carbon leakage.			

5.2.2 Anti-avoidance options

5.2.2.1 Design elements common to all anti-avoidance options

Both options presented below share two common policy measures:

1. to provide the Commission with an empowerment to further detail CN codes to better capture the specific composition of the different products falling within any given CN code under the CBAM scope. This measure addresses the second problem driver. With the empowerment proposed, it will be possible to further detail CN codes to capture the relevant compositions of products within the same CN code.
2. To provide the Commission with an empowerment to attach additional conditions to the use of actual emissions for a combination of goods and origins in case of sufficient evidence pointing towards a high risk of abusive practices. This measure addresses the second problem driver. With the empowerment proposed, it will be possible to introduce conditions to be fulfilled for imports of identified goods, such as requesting evidence demonstrating that the abusive practices have not

[56] This range might be slightly revisited to address for specific cases such as goods at risk of circumvention

materialised. These conditions and evidence should be designed in a way that is proportionate, and which does not burden operators and importers unnecessarily.

5.2.2.2 Policy options for anti-circumvention and other practices to unduly reduce the CBAM liability

The policy options described below aim to address avoidance risks other than replacing CBAM goods with minorly transformed goods, which is addressed via the downstream extension. The two policy options presented in this Impact Assessment are the result of a combination of individual policy measures.

Table 2: Policy options for anti-avoidance

Policy measures	Option 1:	Option 2:
Further detail CN codes to capture composition of products within a given CN code (defined in an empowerment)	Common to both policy options	
Attach additional conditions (defined in an empowerment) to the use of actual emissions for a combination of goods and origins in case of sufficient evidence pointing towards a high risk of abusive practices.	Common to both policy options	
Inclusion of scrap as precursor	Pre-consumer	Pre-consumer and post-consumer
Requesting the provision of evidence[57] to prove place of production to allow the use of actual emissions.	For a sub-set of CN coders/origins	For all CN codes/origins

<u>Option 1</u>

- Inclusion of aluminium and steel pre-consumer scrap as precursor, thereby allowing to attribute emissions to scrap as a precursor and therefore materially addressing the scrap loophole.
- The Commission would have an empowerment to request additional evidence to prove the place of production, addressing the risk of misdeclaration of emissions intensities due to the lack of traceability. Such empowerment would be targeted to imports of specific CN codes, origins, or installations in third countries, with the most material risk of circumvention due to mis-declaration of emission intensity.

[57] The most adequate document identified for steel products is the so-called Steel Mill Certificate, that is the 'ID' of a metal product. It contains the date of production as well as the location of production in most cases. Still, to capture scenarios where the document may not be provided, other documents can be accepted such as invoices etc. Such approach would be consistent with the one used in the context of the sanctions against Russia whereby MTC – as well as other proof deemed adequate – are already accepted.

Option 2

This option builds upon Option 1 but further extends the scope of its policy measures.

- In addition to pre-consumer scrap, this option would also include post-consumer scrap as CBAM precursor.
- The requirement to provide evidence of the place of production would apply to all CN codes/origins. It would therefore affect all CBAM declarations relying on actual values for emissions.

In relation to the risk of mis-declaration of emission intensities, the empowerment allowing to further detail CN codes to capture the composition of products within a given CN code and the empowerment to request the provision of evidence to prove the place of production to allow CBAM declarant to use actual emissions should be sufficient to address this identified risk.

5.2.3 Electricity options

5.2.3.1 Design elements common to all electricity options

For electricity, each option entails two aspects related to the treatment of electricity under CBAM: (i) the methodology to calculate the emission factor and (ii) the conditions to declare the actual values. All options intend to incentivise the production of electricity from renewable sources in third countries by reflecting decarbonisation trends in the calculation of emission factors and by streamlining the conditions to declare actual values. The public consultation responses confirm that stakeholders consider both aspects problematic[58].

Compared to the other CBAM goods, electricity raises greater traceability issues. Once fed into the grid, electricity produced from renewables cannot be distinguished from electricity produced from a fossil-fired power plant. Therefore, country-specific default values of emission factors are needed.

Regarding the conditions to declare actual values, all four options rely on physical PPAs, including both direct and indirect PPAs, between the authorised CBAM declarant and a producer of electricity located in a third country. Across all four options, it is thus clarified that virtual PPAs are systematically excluded. While this allows to tackle the risk of circumvention, it also acknowledges different ways to contract a PPA. Moreover, under all four options, the condition regarding the capacity nomination at the interconnector would only apply in the case of explicit allocation. This last aspect is crucial to allow declarants to claim actual values in the case of implicit allocation. These proposed modifications are deemed necessary to ensure the application of CBAM across different contexts of electricity cross-border trading.

[58] The outcome of the OPC indicated that 90% of the 26 electricity stakeholders who responded consider that the current default values based on the CO2 emission factor are not adequate to achieve the CBAM objective; 69% of the electricity stakeholders who responded consider that the conditions to declare actual values should be amended. More details are provided in Annex 2.

5.2.3.2 Policy options for electricity

Regarding the emission factor, Options 1 and 2 leave the emission factor calculation method unchanged compared to the baseline scenario, i.e., they maintain the CO2 emission factor. Options 3 and 4 provide for an emission factor based on the average carbon intensity of the electricity grid of the country of origin. The average carbon intensity can be calculated as the ratio between the total amount of CO2 emissions stemming from electricity production and the total gross electricity production in the country of origin. This calculation method differs from the baseline scenario as an emission factor based on the average grid would encompass all technologies to produce electricity and not only the fossil-fuel power plants.

With respect to network congestion, Options 1 and 3 entail a shift from the requirement to demonstrate the absence of physical network congestion at the time of the export at any point in the network between the installation and the Union transmission system, which is required in the baseline, to the requirement rather to demonstrate the absence of structural congestion. Options 2 and 4 remove the criterion on network congestion completely. The table below summarises the four policy options considered.

Table 3: Electricity options

<table>
<tr><th>Policy measures</th><th>Baseline</th><th>Option 1</th><th>Option 2</th><th>Option 3</th><th>Option 4</th></tr>
<tr><td>Electricity emission factor</td><td>CO2 emission factor of the exporting country</td><td>Keep the CO2 emission factor of the exporting country</td><td>Keep the CO2 emission factor of the exporting country</td><td>Change to an average grid emission factor of the exporting country</td><td>Change to an average grid emission factor of the exporting country</td></tr>
<tr><td rowspan="2">Conditions for using actual values</td><td>Absence of physical congestion shall be demonstrated</td><td>Absence of structural congestion shall be demonstrated</td><td>Removal of the criterion related to congestion</td><td>Absence of structural congestion shall be demonstrated</td><td>Removal of the criterion related to congestion</td></tr>
<tr><td>Imported electricity is covered by a power purchase agreement

Capacity nomination shall be proven for all imports of electricity</td><td colspan="4">For all four options:
• Imported electricity shall be covered by a physical PPA, including indirect PPA
• Capacity nomination shall be proven solely under explicit allocation</td></tr>
</table>

5.3 Options discarded at an early stage

5.3.1 Downstream

Article 30(3) of the CBAM Regulation requires the Commission to identify downstream products that should be included in the scope of the CBAM, effectively setting out the expected approach for addressing the risk of downstream carbon leakage. A range of alternative options were nonetheless considered initially but not retained in light of the legal constraints and due to significant environmental and feasibility shortcomings.

Voluntary measures, such as product labelling or carbon footprint disclosure schemes, were considered insufficient to address the risk of downstream carbon leakage effectively. These measures rely on the willingness of companies to participate, an unlikely outcome given that affected downstream producers operate in highly competitive, globally integrated markets and, as long as, voluntary action is not sufficiently rewarded by consumers.

International carbon pricing agreements, while desirable, do not appear to be achievable on the needed timeline to tackle the imminent and growing risk of downstream carbon leakage. As an option, it also lacks enforceability and assurance of sufficient ambition.

5.3.2 CBAM avoidance

Several stakeholders requested to make default values compulsory for CBAM goods and to disallow completely the use of actual emissions for all goods and operators. This approach was discarded due to its incompatibility with CBAM's environmental logic and with the EU's international obligations. It could also lead to unnecessary trade friction.

5.3.3 Electricity

While the scope of the options considered for electricity was identified building on the results of a study and via exchanges with stakeholders during the transitional period – as part of the call for evidence (see Annex 2) and dedicated meetings – the following options were considered but ultimately not retained.

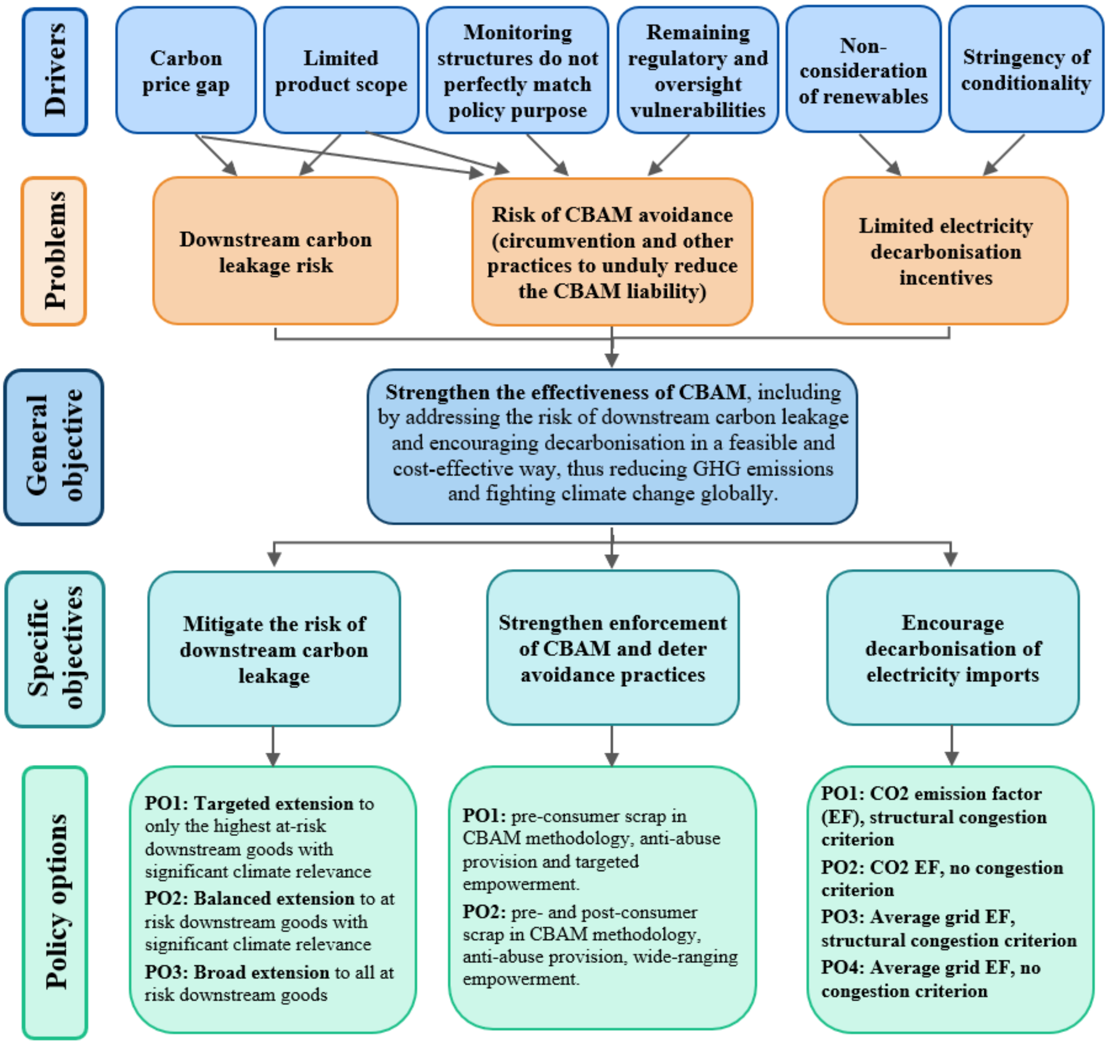
Removing electricity from the scope of CBAM was discarded since this would contradict the ambition that the CBAM addresses the risk of carbon leakage of all sectors covered by the EU ETS. As CBAM is meant to mirror the EU ETS, electricity shall therefore remain within the scope of CBAM to maintain consistency, in line with the polluter pays principle.

Amending the method to calculate default values without changing the conditions to declare actual values was discarded because it would fail to address the problem in its entirety as described in Section 2.2.3.

Amending the method to calculate the emission factor by using a default value that is not reflective of the electricity grid of the country of origin was discarded because the 2021 Impact Assessment already explored a broader range of alternative methodologies to calculate the emission factor for electricity. These included using the (i) average carbon emission intensity of the EU electricity mix, (ii) the CO2 emission factor of the EU electricity mix, and (iii) the country factor for countries with CO2 emission factors below the EU electricity mix. These methodologies are not addressed as part of this Impact Assessment as no new element during the transitional phase has emerged that would require a review of the existing approach, i.e. that the emission factor should systematically relate to the electricity grid of the country of origin. Furthermore, this option would not resolve the difficulties associated with the declaration of actual values.

5.4 Summary of options

[Figure 44: Intervention logic]



6 WHAT ARE THE IMPACTS OF THE POLICY OPTIONS?

6.1 Introduction

The assessment of impacts reflects the different nature of the three problem strands addressed by this initiative[59]. The **downstream** extension is analysed in greatest depth as it provides for the broadest policy choices, whose impacts can be clearly anticipated and delineated both in qualitative and quantitative terms, and with the most significant impacts

[59] Fundamental rights were not assessed in this impact assessment as none of the options raise issues relevant to their protection or exercise. All options are also consistent with the 'do not significant harm' principle (COM(2019) 640 final) as the initiative builds on and reinforces an existing EU environmental policy tool.

of the three problems addressed, since it entails the inclusion of additional products in CBAM's scope. The **avoidance** strand, by contrast, is less amenable to quantitative modelling since the behaviour it targets is by nature covert and adaptive. Furthermore, as no financial charge is yet due on CBAM, that makes it more challenging to identify patterns and actual changes in behaviours by operators. This makes the analysis more reliant on stakeholder feedback and qualitative risk mapping rather than numerical projections. The problem of limited incentives for **electricity** decarbonisation is narrower in scope as it concerns a methodological calibration within a basic good already covered by CBAM. Consequently, the impacts of the electricity options are assessed primarily through evidence from the CBAM transitional phase, a study on electricity as a CBAM good, a sectoral dialogue with experts and stakeholders input including through a public consultation (see Annex 2). These sources have been supplemented building on the findings of the previous CBAM Impact assessment[60] that have been refined using ex-post calculations to incorporate the updated scenarios corresponding to the options covered in the present exercise.

6.2 Downstream

6.2.1 Downstream modelling approach and scope determination

To model the impact of the three options under consideration, computable equilibrium modelling was conducted by the Commission's Joint Research Centre (JRC) with the JRC-GEM-E3 model, using the GTAP 11 Circular Economy database, (see Annex 4). In addition to the main basic materials covered by the current CBAM sectors, the analysis presents the impact on five aggregate downstream sectors[61] that mainly use CBAM basic materials from the sectors 'iron and steel' and 'aluminium' as inputs in their production processes. [62] The sectoral aggregations derive from the GTAP database.

6.2.2 Environmental Impacts

6.2.2.1 Impact on emissions

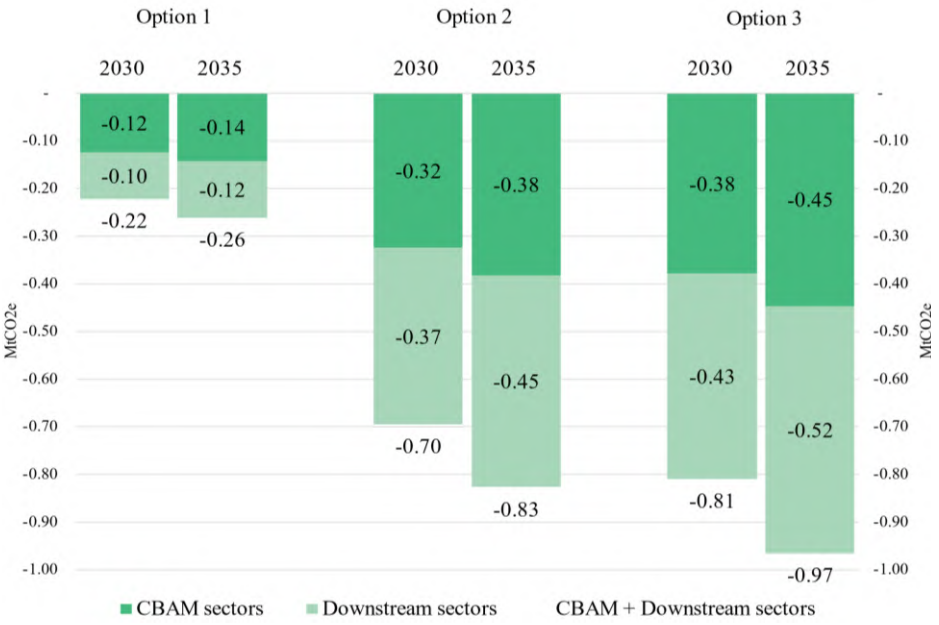
The downstream extension is expected to reduce global GHG emissions under each of the three options. By 2030, the estimated yearly emission reduction is in the range of 0.22–0.81 Mt CO2e, depending on the option (Figure 55). These impacts are relatively evenly split between the CBAM sectors and the downstream sectors. In terms of total emission reductions, Option 2 and Option 3 tend to be in a similar range of 0.83–0.97 Mt CO2e in 2035, while Option 1 would deliver a significantly smaller reduction.

[60] In the 2021 CBAM Impact assessment (SWD(2021) 643 final) the PRIMES electricity sector model was employed in order to project scenarios assuming different levels of default values, Further details are available in Annex 4/3 of this Impact assessment.

[61] Electric goods, transport equipment, other equipment goods, fabricated metal products and motor vehicles & parts. Note that the downstream sector *fabricated metal products* also includes a number of CN codes that were already part of the original scope of CBAM. This has been taken into account for the modelling of the impact of a downstream extension.

[62] For a comparison of how the JRC modelling defines CBAM downstream and other sectors and how this compares to the definitions in the rest of the impact assessment, see Annex 4.

Figure 55: Estimated changes in global emissions due to CBAM downstream extension, 2030-2035 (in Mt CO2e)



Note: Mt of CO2e changes in GHG emissions worldwide. The changes are relative to the baseline (CBAM without downstream extension). Source: JRC-GEM-E3 model.

It is the rest of the world (ROW) where the induced emission reductions would essentially happen, while the EU would see a marginal increase in its emissions (Figure 25 in Annex 7). This divergence is a natural consequence of CBAM and the downstream extension disincentivising carbon-intensive imports. As a by-product, this leads to a small increase in EU production in the CBAM-covered sectors, as illustrated by the macroeconomic and trade estimates in Section 6.2.3.

The emission reductions are mostly driven by sectors related to metals and equipment (see Figure 26 in Annex 7 for 2030 and 2035). Among CBAM sectors, the *ferrous metal* sector delivers 85–95% of the emission reductions. Among downstream sectors, the *other equipment goods* sector drives 25–70% of the emissions, the *fabricated metal products* sector delivers a further 25–50%. In contrast, the *transport equipment* and *electric goods* sectors are marginal in this respect.[63] For the CBAM sectors, *ferrous metals'* overwhelming contribution is stable across the three options, with an 85–95% share. Among the downstream sectors, however, the three options show different results. For Option 1, the main driver is the *fabricated metal products* sector with 45–50% of the emission reductions, while for Option 2 and Option 3, it is the *other equipment goods* sector that drives most of the emission reductions, with a 65–70% share, and the *fabricated metal products* sector is responsible for only 25–30% of the total.

While the downstream extension of CBAM would generate additional global emission reductions, it is on a limited scale. In the absence of CBAM, total global emissions generated by all CBAM sectors in by 2030 are expected to be around 8264 Mt CO2e. The

[63] Except in Option 1, where the Transport Equipment sector is responsible for 27% of the downstream sectors' emission reductions.

introduction of CBAM without downstream extension is expected to bring about 38.3 Mt CO2e emission reduction, while the downstream extension's expected impact is about 0.22–0.81 Mt CO2e emission reduction.[64] Nevertheless, it is important to emphasise that the main purpose of CBAM, and of its downstream extension, is to prevent or mitigate carbon leakage. When assessing CBAM or its extension, the leakage impact is therefore a key measure – see next section (Section 6.2.2.2).

6.2.2.2 Impact on carbon leakage

Modelling results indicate that the CBAM downstream extension could significantly reduce downstream leakage (See Figure 6). Leakage rates are defined as increases in emissions in downstream sectors outside the EU relative to decreases in emissions in those sectors in the EU. The baseline scenario,[65] has leakage rates of 57-63% relative to the No CBAM scenario, due to the introduction of CBAM and the phase out of free allowances.[66] The downstream extension scenarios then further significantly reduce carbon leakage. In particular, Option 2 and Option 3 reduce carbon leakage rates to 18-26%. Option 1 also contributes to leakage reduction albeit somewhat weaker.[67] In the public consultation, 76% of downstream stakeholders agree that there is a significant risk of downstream carbon leakage[68].

Figure 6: Leakage estimates for downstream sectors relative to the No CBAM scenario, 2030-2035.

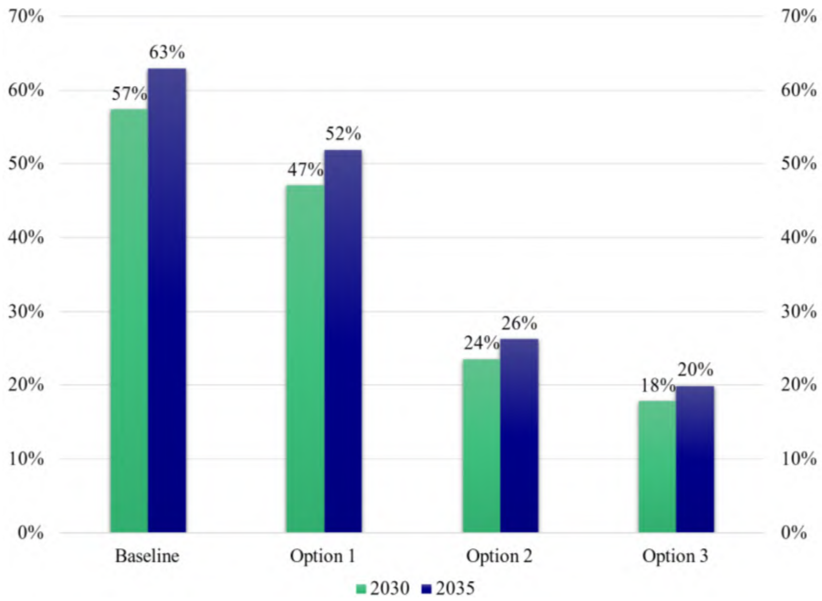
[64] The 2035 estimated figures are the following. No-CBAM total global emissions of all CBAM sectors: 7967 Mt CO2e; emission reductions by CBAM basic: 34.6 Mt CO2e; additional reductions by downstream extension: 0.26–0.97 Mt CO2e.

[65] More details can be found in the baseline description in the Annex's Section 9.10.3

[66] Compared to a scenario where CBAM is not phased in and free allowances are not phased out (No CBAM), emissions in downstream sectors are 2.61 Mt lower in the EU and 1.64 Mt higher outside the EU, UK and EFTA in the baseline scenario. This implies that 1.64/2.61 = 63% of emission reduction in the EU are offset by increases outside the EU (and UK/EFTA) in 2035. The assumed phase out of free allowances in the UK and EFTA also contribute to emission increases in other world regions, which may slightly bias upward the leakage rate; however, by a small amount that is similar amount under all policy options.

[67] The figures presented include both components driving GHG leakage related to the downstream sectors. First, the *direct component* stems from the fact that the downstream products use CBAM materials, such as steel, iron, aluminium, etc., as input that embed GHG emissions. Second, the *indirect component* of GHG leakage is generated by the production process of the downstream goods – for instance, using energy or other materials with their own embedded emissions. Naturally, the embedded emissions originating from non-CBAM inputs can be substantial for the downstream sectors. It follows that even Option 2 and Option 3 do not perfectly eliminate leakage: First, even these more extensive options do not cover all goods that use *some* CBAM input. Second, as the non-CBAM inputs are more important for the downstream sectors (compared to upstream CBAM sectors) the additional cost represented by CBAM only partially disincentivises import.

[68] See Annex 2, Figure 6: 115 of 150 downstream stakeholders consider that downstream leakage occurs, to a very large extent (n= 66; 44%), large extent (n= 25; 17%) and some extent (n= 24; 16%)).



Note: GHG leakage estimates relative to the ***No CBAM scenario*** *(continuation of existing EU policies including the legislated parts of the Fit for 55 package and REPowerEU, but no phase-in of CBAM and corresponding phase-out of free allowances);* ***Baseline****: Continuation of existing EU policies + existing CBAM Regulation;* ***Options 1-3****: Baseline + downstream extension scenarios. Leakage defined as total additional GHG in world regions outside the EU+EFTA+UK. Source: JRC-GEM-E3 model.*

6.2.3 Economic Impacts

6.2.3.1 Macroeconomic and sectoral impacts

The macroeconomic impacts are minimal as the downstream goods added under each option only represent a very small part of the total EU economy. Thus, any measure applied to these goods alone is likely only to trigger minor, if any, effects at the macro level. Modelling results indicate that the impact on EU aggregate GDP is negligible (a change of less than -0.001% under each option). Similarly, the impact on private consumption in the EU is very limited, with an estimated decrease of around 0.01% under Options 2 and 3 and even less under Option 1.

Looking at the impacts on downstream sectors (Table 4), the *fabricated metal products* sector shows the largest increase in output relative to the baseline. Output in that sector in 2035 is estimated to increase by 0.07% under Option 1, 0.16% under Option 2 and 0.19% under Option 3. The effect is largest for this sector as it makes heavy use of steel and aluminium and thus sees the strongest impact of a downstream extension focused on these two basic input materials. The (small) increase in EU output in downstream sectors mirrors the expected reduction in carbon leakage as EU production of downstream goods is not displaced to third countries or replaced by carbon-intensive imports.

Table 4: EU output in downstream sectors (% change compared to baseline)

	2030			**2035**		
Options	1	2	3	1	2	3
Electric Goods	-0.01%	0.01%	0.02%	-0.01%	0.01%	0.02%
Transport equipment	0.04%	0.01%	0.00%	0.05%	0.01%	0.00%
Other Equipment Goods	0.00%	0.06%	0.07%	0.00%	0.07%	0.08%

Fabricated Metal Products	0.05%	0.12%	0.14%	0.07%	0.16%	0.19%
Motor vehicles and parts	0.02%	0.03%	0.03%	0.02%	0.04%	0.04%

Source: JRC-GEM-E3 model

6.2.3.2 Trade impacts

By effectively reducing carbon leakage on the import side, especially for carbon-intensive products, all options are expected to lead to lower import levels for downstream sectors in the EU. Option 1 has the lowest impact on EU imports in downstream sectors as fewer imported goods are affected, with an estimated decrease in imports of 0.08% relative to the baseline by 2035. Option 2 captures almost three times as many import emissions as Option 1, which results in a higher total price paid on imported emissions and a larger reduction in demand for imported carbon-intensive goods. Under option 2, EU imports in downstream sectors are estimated to decrease by 0.29% compared to the baseline. Option 3 has an even broader scope, but the total imported emissions covered is comparable to Option 2. Under option 3, EU imports in downstream sectors are estimated to decrease by 0.35% compared to the baseline. The imports in basic material CBAM sectors in the EU increase marginally compared to the baseline (+0.03%, +0.09% and +0.11% by 2035 under options 1,2 and 3 respectively). As preventing carbon leakage results in an increase in EU output compared to the baseline, this also leads to an increase in the use of basic material inputs which is not fully covered by an increase in domestic production.

In terms of sectoral impacts (for statistical detail see Annex 7), the *fabricated metal products* and *other equipment goods* sectors show the largest decrease in import volumes for the downstream sectors. Similar to EU output, these sectors are most affected as they make relatively more use of steel and aluminium as input materials and the products covered under the extension options are concentrated in these sector aggregations.

On the EU export side, all three options show a very minor decrease compared to the baseline (see Annex 7). This reflects the fact that a downstream extension would raise domestic prices for certain (imported) downstream goods. Some of these downstream goods are used as intermediate inputs in the production of final goods in the EU. As this can marginally affect the cost price of these final goods, this could have a small impact on export competitiveness.

In terms of the exposure of the EU's trading partners to a downstream extension, China is the largest exporter to the EU of goods that would be affected by a downstream extension.[69] Exports from China to the EU of goods covered under option 1 amount to EUR 4 billion. For goods covered under options 2 and 3, exports from China to the EU amount to EUR 18 and 22 billion respectively. Other large exporters to the EU of relevant downstream goods are Türkiye (EUR 1, 8 and 9 billion under options 1,2 and 3 respectively), the United States (EUR 1, 6 and 10 billion under options 1,2 and 3 respectively), the United Kingdom (EUR 2, 5 and 6 billion under options 1,2 and 3 respectively) and Japan (EUR 2, 3 and 3 billion under options 1,2 and 3 respectively). Thereafter, Switzerland, the Republic of Korea, India, Mexico and South Africa are also among the ten largest exporters to the EU of relevant downstream goods. Besides the trade exposure, the degree to which exports by

[69] The numbers referenced in this paragraph are annual (2024) figures from the COMEXT database.

third countries could be affected by a downstream extension also depends on the emission intensity of the exports.

6.2.4 Social Impacts

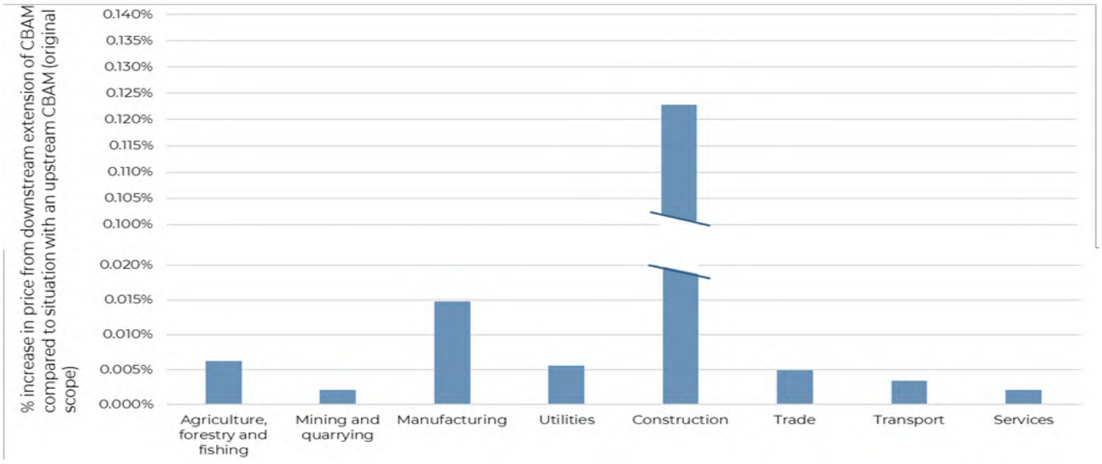
6.2.4.1 Impacts on consumer prices

Price increases for EU final consumers resulting from a downstream CBAM extension are estimated to be very small, with the price of construction goods being most impacted. Based on the downstream supporting study, Figure 7 below shows the estimated average price increase per sector resulting from a downstream CBAM extension (compared to the reference situation with the current CBAM scope).[70] A downstream CBAM extension could increase the average price in the construction sector by about 0.12%.

Beyond construction, a downstream CBAM extension is estimated to also impact other prices for EU final consumers, though significantly smaller (<0.1%). These price increases can be considered as very limited in comparison to general inflation; annual inflation in the EU has ranged from 0.1% to 9.2% over the past decade, with an median of 1.7% per year.[71] A further breakdown of the results at NACE 2-digit level shows that a downstream extension results in the highest price increases for products from the sectors:[72] Repairing machinery (C33), Motor vehicles (C29), Machinery (C28) and R&D (M72) (Figure 7 7). EU consumers could see a 0.08% increase in the price of repairing machinery in the target year 2030, as the downstream CBAM extension would directly and indirectly increase the price of imported replacement parts. Likewise, a downstream CBAM extension, which includes motor parts, could indirectly increase the cost of automobiles and its parts for EU consumers by about 0.07%. Similarly, for machinery the impact would be about 0.05%. For R&D, for which final consumption comes mainly from the government, a downstream CBAM extension could (directly and indirectly) increase the cost of technical materials as well as vehicles used for R&D services. These additional costs for R&D could be passed on, increasing the price of R&D by 0.04%.

[70] Based on the downstream supporting study. Note that a 100% cost pass through rate is assumed.
[71] Eurostat (2025). HICP – annual data (average index and rate of change).
[72] The following 2-digit NACE sectors are subcomponents of the larger sector-aggregates displayed in Figure 7 below. The 2-digit sectors listed here do not fully cover the Figure 7 sector -aggregates, they only show the largest contributors. The Downstream supporting study further shows the corresponding 15 largest 2-digit NACE sectors (Figure 7 7 of the study).

Figure 7: Average increase in price of goods for final EU consumers compared to the reference situation in the target year 2030 (%)



Source: Downstream supporting study. Note: The y-axis includes a scale break between 0.02% and 0.1% to allow the variation in results to be visible for the other sector, as the construction percentage increase is significantly higher.

Sensitivity checks confirm that the results are robust.[73] In particular, the results were tested against alternatives with (i) imperfect cost pass-through, (ii) compliance cost pass-through,[74] and (iii) various sizes of downstream extension scopes. As expected, while partial pass-through results in somewhat smaller consumer price impacts, compliance cost pass-through increases the price impact. Also, the size of the extension scope is positively related to the consumer price impact. However, none of these sensitivity checks reveal a qualitatively different landscape. The ranking of the sectors in terms of price impacts remains the same. Moreover, even the quantitative findings are very similar. The sector with the largest impact, construction, is reported to have an impact figure ranging from 0.08% to 0.13%.[75]

These results may raise the question why despite the expected significant leakage reduction effect of the CBAM downstream extension, the estimated consumer price impacts are so limited. First, the carbon price forms only a part of the overall cost of a downstream product. Second, consumer products are often even further downstream than the CBAM goods in the downstream extension's scope. Final goods do appear among the products considered for downstream extension, but these concern only a small number of CN codes, with most products considered for an extension being intermediate goods. Downstream CBAM goods that are intermediate inputs represent only a share in the total cost of the final goods. Therefore, pass-through into final consumer prices is not one to one. Pass-through might also be influenced by market conditions that prevent full cost transmission. Moreover, other inputs used in producing final goods and services are not affected by the

[73] Downstream supporting study.

[74] In the main scenarios of the Downstream supporting study, the compliance costs are assumed not to be passed-through into consumer prices. The sensitivity check removes this assumption, and calculates instead the impact of compliance costs passed-on fully.

[75] In addition to the results of the downstream supporting study discussed above, the JRC-GEM-E3 modelling results can also shed some light on the downstream extension's consumer price impacts. JRC's estimated price increases from their model simulations are also very limited confirming the downstream supporting study's conclusions. JRC estimated price increases in the range 0.006%–0.02% across 14 sectors.

CBAM downstream extension. Several production layers may separate the CBAM-covered good from the final consumer product, further diluting the marginal, carbon-related cost increase.

Third, domestic producers of downstream goods already internalise carbon costs through the EU's ETS, while foreign exporters may absorb part of the CBAM costs via margin compression. As a result, the downstream extension might mostly rebalance the competitive conditions rather than raising average prices for the final consumer. As explained in Section 6.2.3.1 above, while the EU domestic production in the downstream sectors is expected, albeit minimally, to increase, imports in these sectors would decrease. Fourth, it should be noted that the consumer good sectors reported above (and used in the predictive models) are broad aggregates comprising many more products than those captured by the relevant CN codes. Since none of the policy options cover fully any of these larger consumption aggregates, their price impacts will necessarily be smaller than the direct effects observed at CN-code level. Fifth, CBAM and its downstream extension primarily impact imported goods. It follows that the first-order price effects arise in import-dependent segments, then in goods directly competing with imported goods, and only later (if at all) in broader consumer goods and services markets. In all these markets, competitive pressures and the availability of non-affected inputs may keep final consumer prices in check.

6.2.4.2 Impacts on employment

Overall, the impact of a CBAM downstream extension on employment is limited. The CBAM basic material sectors are generally mostly unaffected and thus not illustrated below. Some of the downstream sectors do have a somewhat more pronounced increase in employment. Unsurprisingly, these concern the downstream sectors that also saw the largest increase in output: *fabricated metal products* and *other equipment goods*.

Table 5: Employment percentage change (downstream sectors compared to baseline)

	2030			**2035**		
Options	1	2	3	1	2	3
Electric Goods	0.05%	0.02%	0.01%	0.06%	0.02%	0.01%
Transport equipment	0.00%	0.06%	0.07%	0.00%	0.07%	0.08%
Other Equipment Goods	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Fabricated Metal Products	0.02%	0.03%	0.03%	0.02%	0.05%	0.04%
Motor vehicles and parts	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Downstream sectors	0.01%	0.05%	0.06%	0.02%	0.07%	0.08%

Source: JRC-GEM-E3 model

6.2.5 Impacts on compliance and enforcement costs

The assessment of the compliance costs of a downstream extension builds upon the downstream supporting study. To estimate the costs incurred by companies and authorities, the contractor has launched a survey among industry participants[76] and has interviewed a

[76] The survey resulted in 130 responses on the expected compliance cost of CBAM as currently legislated and 30 responses on the expected compliance cost associated with a downstream extension.

selection of national competent authorities (NCA) and customs authorities[77]. The findings of the contractor are combined with data on import volumes of CBAM goods in both the baseline and the different extension scenarios to arrive at an estimate of the administrative impact of each of the three options for a downstream extension.

6.2.5.1 Compliance costs for businesses

The total annual baseline compliance cost for companies is estimated to be between EUR **76** million and **371 million**. This is based on an estimated average compliance cost ranging from EUR 4,248 on the low-end to EUR 20,637 on the high-end and an estimated 18,000 importers facing CBAM obligations in the baseline.[78] The fairly broad range for the average cost per importer results from the wide divergence in cost estimates submitted by survey respondents.

Besides these annual, recurring costs, some survey respondents also indicated that they expect one-off adjustment costs. These adjustment costs include initial, one-off costs such as setting up new IT infrastructure or hiring legal or consulting experts to prepare for facing future CBAM obligations. The estimates for these costs differ widely between survey respondents and range from 0 for small importers to EUR 129,000 for the largest importers. In total, **one-off adjustment costs could amount to EUR 388 million** in the baseline (see Annex 4 for more details). It should be noted that the baseline administrative burden would have been much higher without the simplification recently adopted. The *de minimis* threshold excludes around 183,000 importers from the current CBAM's scope, reducing the administrative cost for importers by an estimated EUR 1,123 million per year.[79] The *de minimis* threshold also benefits downstream importers, with more than 90% of importers active in sectors covered by the extension under Options 1, 2 and 3 excluded from CBAM obligations while keeping more than 90% of emissions in scope.

To estimate the impact of a downstream extension, the import volume (in millions of tonnes) of downstream goods covered under each option is compared to the import volume of goods under the current scope of CBAM.[80] As shown in Table 6, the import volume of downstream goods under option 1 is only 2% of the import volume of goods covered by the current CBAM. For options 2 and 3 this is 8% and 9% respectively. The baseline compliance cost is multiplied by these percentages to obtain a first estimate for the additional compliance cost under each option.

As a second step, the additional compliance cost is adjusted to reflect the higher complexity of downstream goods. Survey respondents indicated that the compliance cost associated with a CBAM declaration for downstream goods is 24% to 43% higher than for CBAM basic material goods. The compliance cost range found by comparing import volumes is

[77] Six national competent authorities and six customs authorities were interviewed from seven different countries.
[78] See Annex 4 for the methodology used to establish the cost per importer.
[79] COM/2025/87 final
[80] Import volumes are used for the scaling of the baseline as a proxy for the number of CBAM declarations that can be expected.

thus increased by 24% on the low end and 43% on the high-end. The resulting total additional compliance cost is shown in Table 6 in the last column.

Table 6: Additional total annual compliance cost for EU importers per option

Option	Import volume downstream goods (Mt)	Scale factor*	Additional compliance cost based on import volumes	Total additional compliance cost (adjusted for complexity)
1	2.12	0.02	1.5 – 7.2	2 – 10
2	8.91	0.08	6.2 – 30.1	8 – 43
3	10.03	0.09	7.0 – 33.9	9 – 48

*Import volume downstream as fraction of import volume current CBAM (110 Mt)
Source: Downstream support study, COMEXT, own calculations.

The relatively limited scope of the extension under Option 1 results in the lowest additional import volume (and thus scale factor). The additional import volume associated with a downstream extension under Option 2 is higher than in Option 1, which also results in a slightly higher additional cost of EUR 8–43 million. Option 3 has the broadest scope and thus the largest additional import volume and added compliance cost. Finally, the scale factor can also be used to estimate the additional adjustment cost arising from a downstream extension, capturing one-off costs for importers to prepare for dealing with CBAM obligations. Combining the scale factors with the baseline estimate for adjustment costs results in an estimate of an additional, one-off adjustment cost of EUR 7 million for Option 1, EUR 31 million for Option 2 and EUR 35 million for Option 3.

These results are broadly supported by the public consultation, where around 60% respondents expected a downstream extension to cause additional compliance costs for importers. They indicated that determining embedded emissions and carbon price already paid abroad would have the most substantial cost.

Finally, it is important to recognise that the extension of CBAM downstream will have an impact on the administrative burden imposed on third country producers. While the administrative feasibility has been assessed and confirmed for the lists of CN codes considered under this impact assessment, data on embedded emissions will still need to be collected and transferred along the value chain. Such embedded-emission data is not readily available to feed into a full quantitative assessment. The assessment of different options nevertheless draws from aggregate indicators such as the number of CN codes and the material share of inputs into the final goods to draw conclusions regarding the implied relative administrative burden.

6.2.5.2 Administrative costs for authorities

Similar to the approach for the compliance cost of companies, the interview results are first used to establish the expected cost in the baseline. The impact of a downstream extension is then assessed by multiplying the baseline cost by the scale factors described in Section 6.2.5.1. In contrast to the survey used for companies, the interviews with NCAs and customs authorities did not yield conclusive evidence on the increased costs associated with a higher complexity for dealing with downstream goods. Therefore, no complexity factor is used when analysing the impact of a downstream extension.

National competent authorities

The number of people expected to work on CBAM-related activities differed substantially among interviewed NCAs, ranging from 3.5 full time equivalent (FTE) positions per NCA on the low end to 15 FTE per NCA on the high end. Authorities expect that activities such as investigating potential misdeclarations, coordinating with stakeholders and monitoring non-compliance are likely to be the most time-consuming and thus incur the highest cost. These were followed by costs for review of declarations and the authorisation of CBAM registrations.

Given the differences in the number of staff employed by authorities and the time dedicated to each activity related to CBAM, the total annual enforcement cost differed substantially among interviewed NCAs, ranging from **approximately EUR 1.0 to 2.3 million per NCA in the baseline scenario**.

Authorities have indicated (as part of the interviews conducted in the context of the downstream study) which costs are expected to increase because of a downstream extension. Mainly costs related to the review and authorisation of CBAM declarations, the monitoring of non-compliance and checks on goods at the border are expected to increase because of the increased import volume of CBAM goods associated with a downstream extension. A higher import volume means a higher number of declarations to be checked and compliance checks to be made by authorities.

To assess the impact of a downstream extension, the scale factor is multiplied by the costs in the baseline that depend on the number of CBAM activities. Interviewed authorities indicated that other costs, such as training and setting up and maintaining IT infrastructure are not expected to scale with the number of CBAM activities. Costs in the baseline that depend on the number of CBAM activities are estimated to range between EUR 0.58 to 1.85 million per NCA.

The **additional compliance costs for NCAs** stemming from a downstream extension are **quite limited** due to the low scale factors**, between EUR 0.01 to 0.17 million** (see Table 77).

Table 77: Total additional annual compliance cost NCAs

Scenario	Scale factor	Additional compliance cost per NCA in EUR thousands
Option 1	0.02	11 – 36
Option 2	0.08	47 – 150
Option 3	0.09	53 – 169

Source: Downstream supporting study, COMEXT, own calculations.

Customs authorities

Based on responses from interviewed customs authorities, the expected baseline administrative burden differs significantly across countries, with estimates ranging from EUR 0.02 million to EUR 3 million. This reflects different assumptions that customs authorities have on their exact tasks and responsibilities once CBAM enters its definitive phase. It also reflects whether the country where the authority is based is importing significant amounts of relevant downstream goods. In particular, the estimated cost for dealing with checks and inspection of goods at the border and non-compliance enforcement activities differed between interviewees.

The difference in expected tasks and responsibilities is also reflected in the estimated cost increase from downstream extension. On the low end, interviewees expected no cost increase as they did not expect to have costs that scale with the number of CBAM goods imported. On the high end, interviewees did indicate costs that scale, such as costs for following up on non-compliance and performing inspections at the border. As before, the scale factor is used to estimate how much the downstream extension is expected to raise these costs. Under Option 1, the cost increase would range from EUR 0 – 53 thousand, under Option 2 from EUR 0 – 221 thousand and under Option 3 from EUR 0 – 248 thousand.

<u>Total cost for authorities</u>

Table 88 summarises the total enforcement costs for authorities in both the baseline and downstream extension scenarios. In the baseline, the total enforcement cost for authorities is estimated at EUR 1.0 – 5.3 million per country. At EU level, this boils down to an average cost per importer of EUR 1,500 – EUR 7,950. The total added, annual enforcement cost resulting from a downstream extension is relatively limited for all three options (though clearly lower for Option 1 than for Option 2 and 3). It is assumed that there is no additional one-off adjustment cost for authorities. Organisations, IT systems and staff have already been put in place for the currently legislated CBAM and the higher number of total CBAM declarations arising from a downstream extension only affects the recurrent costs.

Table 88: Annual enforcement cost per authority and country in EUR million

	Baseline cost	**Additional enforcement cost downstream extension**		
	Baseline	*Option 1*	*Option 2*	*Option 3*
Cost per NCA	1.0 – 2.3	0.01 – 0.04	0.05 – 0.15	0.05 – 0.17
Cost per customs authority	0.02 – 3.0	0.0 – 0.05	0.0 – 0.22	0.0 – 0.25
Total cost per country	1.02 – 5.3	0.01 – 0.09	0.05 – 0.37	0.05 – 0.42

6.2.6 Impact on SMEs

The CBAM downstream extension has a moderate impact on the absolute number of SME importers (and third country SME producers) brought into CBAM's scope. For all three options, the proportion of SME importers is in the range of 45-60% among the additional importers, with Option 1 in the lower, Option 3 in the higher end, and Option 2 balanced in between. In terms of absolute numbers, Option 1 impacts an additional 700-800 SME importers, while Option 2 and Option 3 do so for 3800-3900 and 4700-4800 SME importers, respectively.

The cost incurred by EU SME's are mostly administrative costs. The total administrative cost for all companies is outlined in Section 6.2.5.1 above. About half of the importers in scope of the downstream extension are SMEs. The implied costs are thus EUR 0.9–5 million for Option 1, EUR 4.2–22.6 million for Option 2, and EUR 4.95–28.8 million for Option 3.[81] The administrative costs faced by SMEs will likely be on the lower end of these cost ranges since SMEs are more typically smaller importers.

Table 99: Additional SME importers due to CBAM's downstream extension

Option	Additional importers due to downstream extension	Additional SME importers	Additional SME importers' proportion
1	1400-1500	700-800	45-50%
2	7000-7100	3800-3900	50-55%
3	8400-8500	4700-4800	55-60%

Note. Importers below the 50t de minimis yearly threshold are not considered. The figures are estimated using a sample size correction. See Annex 6 for details.

6.2.7 Revenue Generation Impacts

The downstream extension is not aimed at generating revenues but rather at strengthening the climate effectiveness of CBAM in preventing carbon leakage. The modelling suggests that all three options for a downstream extension are projected to generate additional revenues of at least 0.17 billion per year in 2030 (in constant 2015 prices). While Option 3 provides the highest revenue (EUR 0.68 billion), Option 2 comes a close second with EUR 0.58 billion.[82] Beyond 2030, as free allocations under the EU ETS are phased out and CBAM is phased in, revenue should continue to increase, reaching at least EUR 0.22 billion in 2035. Options 2 and 3 are again relatively close in terms of their revenue generation potential, at EUR 0.69 billion and EUR 0.81 billion, respectively.

While these are estimates deriving from model simulations, it should be emphasised that, in practice, the size of the additional revenues from the downstream extension will depend on a number of factors, notably the level of carbon prices effectively paid in the EU and abroad and the actual embedded emissions in the imported downstream products.

Table 1010: Revenue Generation Impacts of the Downstream Extension in EUR billion

2030			2035		
Option 1	*Option 2*	*Option 3*	*Option 1*	*Option 2*	*Option 3*
0.17	0.58	0.68	0.22	0.69	0.81

[81] This is based on the share of SMEs in the total number of importers covered by a downstream extension (Table 9) multiplied by the total additional compliance cost for companies as reported in section 6.2.5.1.

[82] EU ETS carbon prices are an output of the JRC-GEM-E3 model. Expressed in constant 2015 prices, they amount to EUR 113 and EUR 116 in 2030 and 2035, respectively.

Note: These overall CBAM revenue estimates do not account for the fact that, if CBAM were to become an own resource as proposed by the Commission[83], such revenues would enter the EU budget with a delay and a share would remain with the Member States. Source: JRC's simulations with the JRC-GEM-E3 model.

6.3 CBAM anti-avoidance

6.3.1 Environmental impact

Compared to the baseline scenario, both options limit the possibility to circumvent or lower the CBAM adjustment, including by means of abusive practice or misdeclaration of emissions. They therefore reinforce the environmental objective of CBAM, ensuring that the expected benefits are largely achieved.

For the risk of misdeclaration of emissions, the Commission intends to use the empowerment to obtain additional information about the clinker content for cement, nitrogen content for fertilisers, and the alloying content for steel. For example, in the case of cement, the corresponding CN codes 25231000, 25232100, 25232900, 25233000 and 25239000 could be complemented by TARIC codes which would specify the clinker composition for each of these CN codes. Once the CN codes will be further detailed to capture the specific chemical composition of goods for determining emissions, it will be possible to amend the CBAM methodology (which is based on CN codes) such that when a third-country operator produces cement goods under different categories of chemical composition within the same CN code, the operator would determine the embedded emissions under each category separately (i.e., at sub-CN level). Moreover, an indication in the customs declarations of the composition of the goods imported would also allow customs authorities to target their controls toward specific customs declarations (for example, with sizable quantities of low-emissions products), which would make it possible to detect false declarations made to reduce the CBAM adjustment.

Finally, it is important to underline that aluminium and steel are likely to be the sectors most impacted by avoidance since they represent 536 out of 571 CBAM codes (94%), totalling 74 % of the net mass of all CBAM imports for 2024.

Option 1 foresees to include pre-consumer scrap as a precursor, which is high-quality and relatively easy to incorporate in the production of metals. This would ensure that high-emission primary production cannot simply be offset through the opportunistic reallocation of pre-consumer scrap as input. This would strengthen effectiveness to address carbon leakage in the EU, since imports from carbon-intensive third countries' producers would face a CBAM adjustment adequately reflecting their carbon footprint. This also discourages the selection of low-carbon products being routed to the EU whilst carbon intensive products remain traded to non-EU markets, thus hindering any decrease in GHG

[83] COM(2025)574. Proposal for a Council Decision on the system of own resources of the European Union and repealing Decision (EU, Euratom) 2020/2053. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:52025PC0574

emissions. Such policy would also send a clear signal to third country producers exporting to the EU market that CBAM is intended to incentivise reductions in carbon intensity.

Option 2 represents a broader approach to address CBAM avoidance. It includes both pre- and post-consumer scrap as precursors and thus has the advantage of limiting further attempts at mis-qualifying scrap. However, this comes at the cost of discouraging the circular economy, with negative environmental implications.

Regarding the environmental impact of the inclusion of post-consumer scrap as precursor, the following should be noted: it is likely to disincentivise the circular economy, and it would not therefore be consistent with several EU policies to encourage circulate economy. More specifically:

- Firstly, post-consumer scrap can be assimilated to a waste rather than a byproduct. This End-of-Life product has no linkage with the production of CBAM goods as such which does not expose it to the risk of carbon leakage.
- Secondly, including post-consumer scrap as precursor could have unintended consequences, particularly by undermining recycling efforts. This change would make producers in third countries who aim to recycle end-of-life products not competitive against producers using primary metals. Consequently, this would disincentivise the recycling, making it less economically attractive. This competitive disadvantage might deter companies from investing in recycling technologies and processes, as they would not get a return on investment if they were penalised or not given credit for using less carbon-intensive materials.
  Lastly, the recycling of post-consumer scrap is also emphasised in several policies in Europe, given its importance for the circular economy. European policies are actively promoting the recycling of post-consumer metal scrap as part of a comprehensive circular economy strategy. These policies aim to create a unified market for secondary raw materials, harmonise waste regulations, set targets for recycled content in new products and enhance high-quality recycling at the end of life. Existing regulations, such as Council Regulation (EU) No 333/2011, establish end-of-waste criteria for certain types of scrap. In addition, improved sorting and treatment of metal scrap are necessary to boost demand and ensure its use in high-quality applications, particularly in sectors like the automotive industry. As noted in the Steel and Metal Action Plan, the European Commission is considering setting targets for recycled steel and aluminium in key sectors, including conducting a feasibility study on the recycled content obligations for steel and aluminium under the proposed End-of-Life Vehicles Regulation (Q4 2026). Additionally, the Steel and Metals Action Plan mentions the forthcoming Circular Economy Act , which is expected to assess the feasibility of introducing recyclability and recycled content requirements for steel and aluminium e.g. in relevant construction products or specific products under the Ecodesign for Sustainable Product Regulation. Including post-consumer scrap in CBAM could be perceived as conflicting with these policies by discouraging recycling, thereby undermining efforts to create a more circular economy.

6.3.2 Administrative and compliance costs

6.3.2.1 Inclusion of scrap as CBAM precursor

6.3.2.1.1 Impact on businesses and on authorities

Negligeable administrative cost were identified for businesses. The impact of the inclusion of scrap as a precursor is limited to a methodological dimension for the calculation of embedded emissions. This will be part of the already existing efforts to compute embedded emissions for the verifier of the operators.

No additional administrative cost was identified for authorities as its impact is limited to a methodological dimension for the calculation of embedded emissions. The inclusion of scrap as a precursor will not mean that more declarations need to be monitored. Under option 1, it would however need to be ensured that pre-consumer scrap has not been misqualified as post-consumer scrap, but such work would significantly rely on the verification process.

6.3.2.2 Additional provisions

6.3.2.2.1 Impact on businesses

The shared feature of both options 1 and 2 foresee an empowerment to further detail CN codes to capture the composition of products within a given CN code is common to both options. Nevertheless, in the cases where additional granularity in the reporting of CN codes will be required, this is not expected to lead to material costs for businesses since importers are already familiar with existing mechanisms (such as TARIC codes) which are broadly used. Regarding the additional conditions that would be attached to the use of actual emissions for goods at high risk of abusive practices, the burden would be negligeable for importers. The evidence collection effort for the operator is deemed to be marginal since standard accounting and commercial documentation is under consideration.

Option 1 follows a targeted, risk-based approach, imposing stricter reporting requirements only on businesses where CBAM avoidance risks are the highest, based on evidence and analysis by the Commission and national authorities. In particular the traceability requirements are introduced for a subset of CN codes/origins, limiting the number of impacted businesses. Furthermore, it allows more easily to rely on evidence that is available and common in industry or trade practice, for example in the context of sanctions against Russia where Metal Test Certificates are already used to prove the place of production for metal products. Feedback from stakeholders confirmed the broad availability of such supporting documentation in the steel industry.

Option 2 follows a broader and hence more burdensome approach from an administrative and compliance costs perspective. For the submission of additional supporting documentation, it would impose a systematic reporting on all CN codes, creating a disproportionate effort for business irrespective of their relevance in anti-avoidance action.

6.3.2.2.2 Impact on Authorities

Option 1 generates negligeable to no additional costs for Authorities. In relation with the review of evidence for the use of actual emissions, the fact that the supporting documentation would be already known by public authorities in the context of other policy measures (e.g. sanction enforcement[84]) means the extra processing burden would remain in check and negligeable (with limited need for training for example).

Option 2 entails a significantly higher number of impacted businesses, mechanically impacting the number of reviews by authorities.

Regarding the additional conditions that would be attached to the use of actual emissions under certain conditions, the burden would be similar for national authorities under both options.

6.3.3 Economic impact

6.3.3.1.1 Macroeconomic impacts

The anti-avoidance measures aim at ensuring that CBAM functions as it is planned to. Therefore, the macroeconomic impacts of a successful anti-avoidance are reflected in the expected impacts of CBAM as such. No separate macroeconomic impact was identified.

6.3.3.1.2 Trade impacts

Similar to the above, it needs to be emphasised that the anti-avoidance measures aim at ensuring the effectiveness of CBAM. While they should ensure that the reported emissions are reflective of reality, they should not as such impact on trade flows.

6.3.4 Social impacts

No specific social impact was identified. However, an effective fight against avoidance does ensure the fairness of the system, as it ensures that those who are supposed to pay a CBAM charge effectively do so. A fair system contributes to greater cohesion and support for the mechanism.

6.3.5 Revenue Generation impact

The avoidance measures under assessment are not aimed at generating additional revenues, but rather to safeguard the climate impact of CBAM and, by extension, safeguard revenue that would have otherwise been lost. Both Option 1 and Option 2 have a significant impact in terms of safeguarding otherwise forgone revenue. The inclusion of scrap as CBAM precursor, and its subsequent inclusion in CBAM methodology as a precursor, would address a material share of the avoidance strategies. In fact, pre-consumer scrap is estimated to represent around 40% of the total scrap intake for both the Aluminium and the Steel making processes based on industry intelligence[85]. As regards abusive practice,

[84] https://finance.ec.europa.eu/publications/consolidated-version

[85] Bureau of International Recycling, OECD, International Aluminium Model flow update of 2021.

they may have a negative effect on revenue generation and therefore adequate steps are proposed to tackle this risk to future proof the CBAM.

6.4 Electricity

6.4.1 Environmental impacts

The assessment of environmental impacts focuses on the change in the calculation methodology of the default values compared to the baseline scenario, based on the methodological approach which is described in Annex 4.3.

The baseline provides for a calculation of the default values based on the CO2 emission factor, which is only reflective of electricity produced from fossil fuels. On the other hand, Options 3 and 4 assume a calculation of the default values based on the average electricity grid of the exporting country and therefore encompass all technologies. Therefore, Option 3 and Option 4 differ from Option 1 and Option 2, which preserve the calculation method used in the baseline scenario.

The results of the analysis indicate varying effects of Option 3 and Option 4 on environmental indicators within the EU and its neighbouring countries compared to the baseline scenario.

The primary element influenced by a change in the calculation method of the emission factor is the CBAM obligation – i.e. the payment per imported electricity. Option 3 and Option 4 lead to a reduced emission factor, consequently decreasing the level of the CBAM obligation for electricity importers.

The reduction in emission factor would be relevant to all exporting countries, but the extent of such reduction at present would be higher for those countries with a more decarbonised electricity grid. Based on the emission factors that are currently in use during the transitional phase of the CBAM, the extent of the reduction would range between 5% to over 60%, with an average reduction above 35%.

Analysis based on the EU energy system model PRIMES indicates that Options 3 and 4 lead to a decreased liability of 18€/MWh imported in 2030 and 54€/MWh imported in 2035. Thus, electricity imports from non-EU-ETS countries[86] would become cheaper under Options 3 and 4, compared to the baseline scenario.

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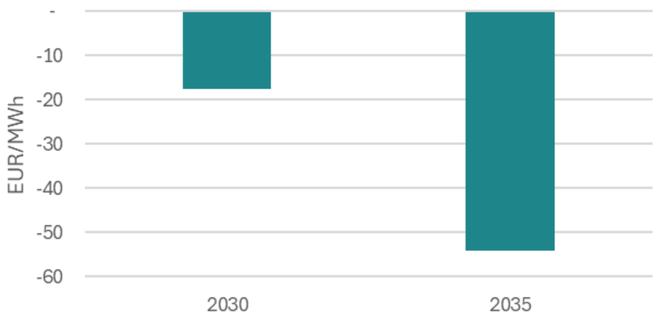
[86] The EU ETS countries are those applying the EU ETS or coupled with the EU ETS. These are: EU27, Switzerland, Norway, Iceland, Liechtenstein, and for electricity, Northern Ireland. Non-EU-ETS countries are all other countries.

Figure 8 Change in the CBAM obligation in Option 3 and Option 4 compared to the Baseline, 2030 and 2035

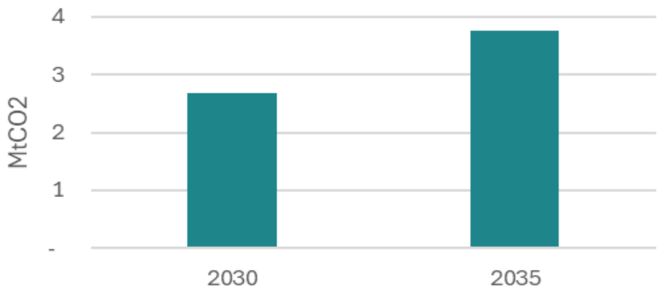


Source: Analysis based on PRIMES modelling of the previous 2021 Impact Assessment.

Despite a higher CBAM obligation in the baseline, both Option 3 and Option 4 are projected to result in very similar levels of EU emissions as the baseline scenario. Specifically, the emissions in the EU's generally cleaner electricity mix are estimated to be around 3 MtCO2 lower in 2030 and 2035 in Options 3 and 4, which would represent around 0.1-0.2% of total projected EU CO_2 emissions from EU power generation.

Overall, total CO2 emissions (EU and exporting countries combined), are projected to modestly increase in the Option 3 and Option 4 by 3-4 MtCO2 due to the lower default value (Figure 9). This rise in emissions is driven by the increased power generation in the exporting countries and would represent only around 0.1-0.2% of total projected emissions in the EU and non-EU ETS exporting countries.

Figure 9 Total change in CO2 emission in EU and exporting countries combined in Option 3 and Option 4 compared to the baseline scenario, 2030 and 2035



Source: Analysis based on PRIMES modelling of the 2021 Impact Assessment.

As power generation shifts from the EU to exporting countries—where carbon-intensive power generation is more prevalent—there is a marginal increase in overall emissions. However, under Options 3 and 4, CBAM payments reflect the efforts of exporting countries when pursuing decarbonisation[87]. This shift incentivises investments in the decarbonisation of power generation.

Under Options 3 and 4, renewable power generation is projected to be 0.1 TWh and 0.3 TWh higher compared to the baseline for the years 2030 and 2035, respectively. This is attributed to the increased load to cover for exporting countries under Options 3 and 4,

[87] It is relevant to consider that emissions linked to the imported electricity could be lower, in line with expected rise of clean production technologies in third countries. Additional information is provided in Annex 10.

stemming from increased exports to the EU, thereby requiring more power generation. It is crucial to highlight that the impact of Options 3 and 4 on renewable energy deployment in exporting countries is expected to be more pronounced in reality. This is due to the fact that the methodology of the present Impact Assessment does not fully capture the altered incentive structure resulting from the effect of a cleaner power mix on the calculation of the default values.

Using recent power system projections of Energy Community countries[88] from a report by Trinomics et al. (2024)[89] and applying the current country- and source-specific emission factors it is shown that under the baseline, the default values (calculated as CO2 emission factors, "CO2 EF") would remain largely unchanged across Energy Community countries, notwithstanding the considerable deployment of renewable energy sources by 90% between 2020 and 2035. This is due to the fact that the composition of fossil fuel-based generation would remain almost unchanged thus leading to a stable value of the CO2 EF. In contrast, under Options 3 and 4, the default value is projected to decrease by around 35% due to increased share of renewables, that is reflected in the revised calculation approach proposed under Options 3 and 4. This is expected to result in a strong incentive to expand renewable infrastructure in exporting countries to further lower the CBAM default value.

This effect is expected to be further sustained by facilitating the use of actual emissions. All the options under consideration include such facilitations but in varying degrees, with Options 2 and 4 scoring the highest in this regard.

It should also be noted that an increase in the share of renewable energy in exporting countries can be expected to occur in the coming years based on existing initiatives and decarbonisation commitments, as described in further detail in Annex 10. This evolution would temper the marginal increase in overall emissions referred to above.

6.4.2 Economic Impacts

The imposition of CBAM on electricity is expected to lead to a reduction of electricity imports as they become more expensive. Consequently, domestic generation of electricity increases, all else equal, and power sector investment is adjusted. It should be noted,

88 Excluding Georgia and Ukraine.

89 The authors analyse the power systems in EnC CPs under different carbon pricing scenarios. The baseline scenario does not include additional carbon pricing policies apart from those already enforced by July 2024 in the Energy Community Contracting Parties. The repost is available on: https://www.energy-community.org/news/Energy-Community-News/2025/01/14.html#:~:text=The%20Energy%20Community%20is%20exploring%20four%20carbon%20pricing,carbon%20tax%2C%20and%20integration%20into%20the%20EU%20ETS.

however, that in the current EU context, structural challenges may constrain the speed and scale at which domestic generation and investment can adjust.

Compared to the baseline, Option 3 and 4 encourage more electricity imports from non-EU-ETS countries. Under Option 3 and 4, net electricity exports decrease by around 10 TWh in 2030 and in 2035, which make up around one third of today's total net exports.

Due to more imports from non-EU-ETS countries, net power generation in the EU would decrease by 0.3%. From a system perspective, lower EU generation brings about lower generation costs which are, however, almost fully compensated by more payments for electricity imports. The net results indicate that power system costs (excluding CBAM revenues) are only mildly affected by CBAM but would slightly decrease under the Option 3 and 4.

Under Option 3 and 4, the non-EU-ETS exporting countries see more load to cover, due to higher exports, leading to a rise in investments. The increase of export volumes is accompanied by a decrease in total costs, due to higher economies of scale and decrease in relatively more expensive imports.

6.4.3 Social Impacts

The CBAM liability and all related administrative costs will ultimately be passed on to consumers, at least partially. Options 1 and 2 as well as the baseline rely on the use of the CO2 emission factor which implies higher CBAM obligations compared to Options 3 and 4. The CBAM obligation for electricity is significant directly from 2026, as free allocation for electricity is already phased out. Therefore, although this impact has not been quantified, it is expected that Options 3 and 4 will likely lead to lower electricity prices for consumers than Options 1 and 2 and the baseline.

6.4.4 Administrative Impacts

Overall, the administrative impacts of the proposed amendments are expected to be limited, as, the assessed policy options for electricity do not entail a change in the CBAM scope but rather an adjustment of the methodology. Therefore, none of the policy options will affect the number of electricity importers covered by CBAM or the number of declarations submitted.[90]

For all options, the emission factors will be determined upfront by the Commission, using best available data, and will be published. Importers will then use these fixed emission factors for calculating the emissions embedded in the imported electricity. There is thus no difference in terms of administrative burden with respect to the type of emission factor used.

[90] It is important to note that under the transitional period, the level of activity and thus total associated administrative costs related to the declaration of electricity imports has remained significantly low compared to the other sectors. Between October 2023 and June 2025, CBAM reports related to imported electricity represented 0.14% of the total CBAM reports. CBAM reporting declarants of electricity imports represented 0.32% of the total amount of declarants.

Allowing indirect PPAs (in all four options) will likely ease the compliance burden of importers, as it will probably be easier to get such documentation from the intermediate electricity trader without the need to get back directly to the electricity producer, who may be unknown to the importer. On the other hand, increased flexibility means that probably more importers will claim actual emissions, which could result in higher enforcement costs for verifiers, national competent authorities and the Commission. However, it is not possible to estimate at present the scale of such an effect, given the extremely limited information available on the level of penetration of cross-border PPAs, as discussed in prior sections of this report.

The amendment that capacity nominations are only relevant in the case of explicit capacity allocation (in all four options) provides legal clarity to importers when this criterion applies and therefore reduces the need for guidance or clarifications. This change, too, could potentially lead to an increase in CBAM declarations based on actual emissions instead of default values, However, the impact of such an increase is likely to be extremely low. This is not only due to the low levels of CBAM activity in the electricity sector as a whole[91] but also due to the fact that the majority of electricity imports from non-EU ETS countries occurs based on explicit capacity allocation at present.

On the other hand, all options under consideration lead to a reduced complexity and thus administrative burden associated with the use of actual emissions.

Options 2 and 4 would completely remove administrative burden from importers, verifiers, national competent authorities and the Commission in relation to network congestion.

Concerning this particular condition, Options 1 and 3 still maintain administrative burden, but less so than the baseline. Applying the criterion of structural network congestion means that the parts of transmission systems which are prone to network congestion should be identified and published or in any case made available upfront, so that importers could then more easily refer to this information. At the moment, this is not ensured. In any case, some work by national competent authorities or other sectoral actors such as TSOs would be needed for the identification.

6.4.5 Revenue Generation Impacts

Under Options 3 and 4, annual CBAM revenues are projected to reach approximately EUR 170 million in 2030 and EUR 280 million in 2035[92]. No such revenue projections have been produced for Option 1 and 2. However, projections from the 2021 Impact Assessment suggested that alterations in the basis for calculating CBAM obligations were offset by changes in import volumes, leading to comparable CBAM revenue figures across different scenarios. While a high default value acts as a deterrent to imports, it also results in increased revenue per unit of imported electricity. Conversely, a lower default value reduces the payment per unit of imported electricity yet encourages higher import volumes.

91 Please see footnote no. 90.

92 In 2015 prices.

7 HOW DO THE OPTIONS COMPARE?

This Section compares the policy options for the three problem strands addressed in this impact assessment using, to the extent feasible, the Better Regulation criteria of effectiveness, efficiency, and proportionality[93]. Effectiveness refers to the extent to which an option achieves its intended specific objectives, which are outlined in Section 4.2. Efficiency considers the balance between the environmental benefits expected and the administrative and compliance costs required to achieve them. Proportionality assesses the extent to which the scale of the intervention under each option is commensurate with the magnitude of the risks identified.

7.1 Downstream

Across the three options, the modelling reveals only marginal differences in economic and social impacts. Environmental impacts are marginally better under Option 3 than Option 2, while markedly inferior under Option 1, at less than one third of the emissions reduction. Option 3 would result in the highest administrative burden, Option 1 in the lowest and Option 2 lies in between.[94] It should be noted that the estimates on administrative burden of section 6.3.2 do not consider differences in the types and complexity of goods (CN codes) included in each of the options.

To distinguish more clearly between the three options, this section discusses additional efficiency and proportionality indicators. In addition, the environmental benefits of each of the options is considered. The emissions covered under each option are compared to the number of additional goods (CN codes) that would be added to the scope of CBAM, as shown in Table 11Table 11. All else equal, fewer goods in scope are preferable, as this lowers the number of third country producers affected. Similarly, all else equal, it is preferable to have fewer EU importers affected by the extension to limit their administrative burden.

For this reason, the impact assessment considers the following two **efficiency indicators** for which a higher score is better:

- EU production emissions per CN code included: measures environmental coverage relative to the number of new products added to the scope of CBAM.
- Import emissions per number of importers affected: measures environmental coverage relative to the additional importers facing CBAM compliance costs.

A **proportionality indicator** is introduced to ensure that any downstream extension is commensurate with the scale of carbon leakage risks. This indicator at the same time considers the complexity of goods added under each option in view of limiting the increase in administrative burden. This is achieved by considering the material composition of the downstream products that would be added to scope. Products with a higher share of basic

[93] Coherence was ensured via Interservice Steering Groups meetings (ISSG) where relevant DGs were consulted to avoid duplication and ensure consistency with existing policies. Consistency with the Sustainable Development Goals is further developed in Annex 3 of the Impact Assessment. Furthermore, all options are constructed to ensure continued consistency with the EU ETS and the wider EU climate framework by reinforcing fair and predictable carbon pricing as well as promoting investment in low- and zero-carbon production.

[94] Further sensitivity analysis of the options is provided in Annex 7.

materials in their weight have more embedded emissions relative to the total weight of the product and are thus typically the most at risk of leakage. Furthermore, a higher share of CBAM content generally implies less complex products and supply chains, considering the homogeneity of inputs. This means that these goods are expected to lead to relatively lower compliance and enforcement costs, as assigning embedded emissions is more straightforward.

- Share of included CN codes with ≥ 70% basic good content (materiality) in terms of mass: approximates simplicity of attributing embedded emissions.

The comparison of the three options against these indicators suggest that Option 2 fares best in advancing the environmental objectives of CBAM while keeping the administrative burden in check. More specifically, Option 2 covers almost as many emissions as Option 3 (and twice as many as the Option 1) with much fewer CN codes than under Option 3. Moreover, while Option 2 and Option 3 affect four to five times more importers than Option 1, the data suggest that Option 2 is still marginally better by affecting about 15% less than Option 3. Therefore, on aggregate the administrative burden is expected to be lower under Option 2 than Option 3, as less producers and importers will be concerned.

Option 2 also ensures that an overwhelming majority of goods (85-90%) are composed predominantly of CBAM materials (a share in the weight of goods of 70% or more).[95] Among the goods covered under option 2, there is a mix of final goods, components and pure materials. In the case of Option 3 the share of CBAM materials is slightly lower at 75-80%, meaning that this option includes more complex goods and supply chains, which could result in higher compliance and enforcement costs. Although Option 1 covers an even higher share of goods (85-100%) for which assigning embedded emissions would be relatively straightforward, this would come at the expense of halving the expected environmental benefits compared to Option 2.

Table 11: Comparison of downstream options

	Indicators	Option 1: Targeted extension	Option 2: Balanced extension	Option 3: Broad extension
General	Number of additional CN codes	70-80	150-180	230-250
	Number of additional importers	1400-1500	7000-7100	8400-8500
Effectiveness: benefits	EU production emissions (Mt CO2 eq.) covered	45-60	110-120	110-120
Efficiency: benefits / costs	EU production emissions (Kt CO2 eq.) / number of CN codes	680-740	720-730	470-480
	Import emissions (Kt CO2 eq.) / number of importers	1.1-1.15	1.1-1.15	1.05-1.1

95 About 10-15% of the goods have a materiality share below 70%. Among these goods, the average materiality share is 62%. That is, CBAM materials still constitute the dominant component of these products. The goods in question are predominantly machines, motors, and other appliances that can have other, non-CBAM components.

Proportionality	Share of CN codes with ≥ 70% basic good content (kg)	85-100%	85-90%	75-80%
Administrative burden	Estimated additional compliance and enforcement costs in EUR millions[96]	2.1 – 12.7	9.1 – 53.0	10 – 59.8

7.2 CBAM anti-avoidance

Option 1 reflects a proportionate approach, targeting only high-risk areas to minimise unnecessary administrative burden, while allowing for timely reaction where needed. While overall, the two options are expected to have a similar environmental impact, Option 2 is considered to trigger incremental additional administrative burden compared to Option 1. Both options will have negligeable macroeconomic, trade or social impacts, and both fare similarly well from a revenue perspective. All things considered, option 1 is the most proportional among the two and fares better in terms of costs and benefits. It therefore also aligns better with the subsidiarity principle.

The impact was assessed in a comparative way between the 2 options. For the particular example of "Small to Moderate" for Administration and Compliance in Option 1, this scoring was attributed in light of the comparatively significantly lower number of importers and SMEs that could be impacted by the requirement of traceability reporting requirements compared to the Option 2.

Table 12: Comparison of CBAM anti-avoidance options

Impact	Option 1	Option 2
Environmental impact	High	High
Administrative & compliance (both importers & authorities)	Small to Moderate	Moderate to High
Economic	Negligeable	Negligeable
Macroeconomic	Negligeable	Negligeable
Trade	Negligeable	Negligeable
Social	Negligeable	Negligeable
Revenue Generation / protection	High	High

7.3 Electricity

The four options are compared in this section based on their respective effectiveness (ability to incentivise the decarbonisation of electricity imports) and administrative burden reduction.

[96] Estimates include compliance cost for companies and enforcement cost authorities for EU as a whole. .

In view of the existing data limitations, including on the level of penetration of different types of PPAs in a cross-border setting, a full quantification of costs and benefits associated with the options under consideration is not possible at present. Consequently, although a precise comparison of efficiency of the options is not feasible, the four options are compared in this context based on the qualitative assessment of the reduction of administrative burden that has been carried out in section 6.4.4.

The assessment of the scale of the impact (ranging from negligeable to high) is done in a comparative way between options, and on a qualitative basis. The results are summarised in Table 13 : Comparison of CBAM electricity optionsTable 13.

Concerning effectiveness, out of the four options presented, Option 1 involves the least fundamental changes compared to the baseline and therefore provides the least incentives to achieve the specific objective defined in Section 4.2 of the Impact Assessment. Like Option 1, Option 2 limits the acknowledgement of any decarbonisation trends in third countries as the default values would continue to rely on the CO2 emission factor of the electricity grid of the exporting country. However, compared to the baseline scenario, this option would streamline conditions for declaring actual emissions to a larger extent than Option 1, as declarants would not be required to demonstrate any form of congestion.

Option 3 more effectively acknowledges the decarbonisation of the electricity grid in third countries, as the calculation method of the emission factor would be based on the average electricity grid of the exporting country. In order to declare actual values, CBAM declarants would be required to prove the absence of structural congestion. Option 3, therefore, uses a mixed approach, as the calculation methods of the default values for electricity would acknowledge decarbonisation trends, while the requirement to prove the absence of structural congestion would involve a stricter condition on congestion, compared to Option 4. Concerns about the possibility to meet this condition in practice would thus be met to a lesser degree.

Option 4 sets out a methodology for calculating default values that would most effectively acknowledge the decarbonisation trends in exporting countries, as well as significantly streamline the declaration of actual values, since the condition to demonstrate the absence of congestion would be removed. Therefore, Option 4 is best placed to achieve the specific objective defined for electricity, as it provides the highest incentives for the decarbonisation of electricity imports to the EU (both through the emission factor and the conditions to declare actual values). It is also noted that out of the four options considered, the methodological changes included in Option 4 would best reflect the outcome of the public consultation.

All options are expected to reduce the administrative burden related to the methodology to declare actual values, compared to the baseline. The demonstration of structural congestion (as required under Options 1 and 3) could potentially be simpler to prove than the absence of physical congestion as it would not require detailed time-specific congestion data although its practical implementation may still lead to uncertainties and related costs. Options 2 and 4 entail an even more substantial decrease in the administrative burden as the condition to demonstrate any form of congestion is completely removed.

Table 13 : Comparison of CBAM electricity options

	Option 1: CO2 emission factor, absence of structural congestion	Option 2: CO2 emission factor, removal of criterion related to congestion	Option 3: Average of the grid emission factor, absence of structural congestion	Option 4: Average of the grid emission factor, removal of criterion related to congestion
Effectiveness: Encourage the decarbonisation of electricity imports	Negligible	Moderate	Moderate	High
Reduction in the administrative burden	Moderate	High	Moderate	High

8 PREFERRED OPTION

8.1 Downstream

On balance, Option 2 ('balanced extension to at-risk downstream goods with significant climate relevance') is retained as the preferred option by the Commission. The indicators show that Option 1 ('targeted extension to the highest risk downstream goods only') is markedly inferior compared to Option 3 ('broad extension to all at-risk downstream goods'), as well as the preferred Option 2 in terms of the environmental benefit it is expected to generate. They also show that Option 2 delivers nearly the same coverage of EU production emissions as Option 3, while including fewer CN codes, fewer importers and simpler goods.

In other words, Option 2 captures almost all significant EU production emissions for downstream goods at risk of carbon leakage with notably better efficiency and proportionality, thereby keeping the additional administrative burden relatively low.

8.2 CBAM anti-avoidance

Option 1 is retained as the preferred option in light of its ability to strike a balance between environmental impact, the administrative and compliance costs, and revenue protection impacts. Option 1 is more targeted, allowing to address the scrap loophole as well as the risk of mis-declaration of emission intensity, through better traceability requirements and a better specification of the content of products imported. Option 1 is able to address these issues while limiting the additional administrative burden for both importers and authorities. Option 1 provides also the flexibility and adaptability needed to address CBAM avoidance, future-proofing CBAM against evolving avoidance practices, but also acting in a timely fashion where risk arises.

Option 1 is fit for purpose for addressing CBAM avoidance risk and keep the CBAM avoidance risks in check.

1. First, the non-inclusion of post-consumer scrap as CBAM precursor could lead to attempts by third countries' operators to mis-qualify pre-consumer scrap as being post-consumer scrap. Nevertheless, given the negative impact of including post-

consumer scrap in terms of disincentivising circular economy, the report concludes that, on balance, it is preferable to include pre-consumer scrap only. Furthermore, there is a mitigating factor in terms of verification. If the operators in third countries are not able to prove that the scrap originates from products at end of life (recycling such products requires recycling facilities), then it will be considered as pre-consumer scrap.

2. Second, strict traceability requirements would only apply to specific CN codes/origins where data of the CBAM transitional registry show high degrees of emission intensity heterogeneity. While channels of circumvention may remain open, they are not deemed, on balance, to warrant strict traceability requirements for all CN codes/origins (since it would concern all CBAM declarants).

8.3 Electricity

Option 4 is retained as the preferred option because it addresses all the main issues identified whilst ensuring feasibility of implementation. Under Option 4, the emission factor for electricity will be calculated based on the average electricity mix of the exporting country. Compared to the baseline scenario, this will better reflect the decarbonisation trend of the country of origin, as electricity produced from renewable sources will be accounted for. This calculation method, coupled with the amended criteria to declare actual values will maximise the incentives for electricity grid decarbonisation while alleviating the difficulties in reporting actual emissions in case of electricity produced from low-emission sources. The inclusion of indirect PPAs will allow CBAM declarants to report actual emissions even in case of electricity imports from countries where no direct PPAs exist due to their market structure and regulatory constraints. In addition, the removal of the condition of absence of network congestion will further facilitate the reporting of actual values. Lastly, by ensuring that the capacity nomination shall be proven solely under explicit allocation, Option 4 will enable electricity importers to claim actual values for imported electricity even in cases where this is traded by implicit capacity allocation. This form of trading currently only relates to electricity exchanged between UK and Ireland. In addition, Option 4 will lead to the highest reduction in the complexity and thus administrative burden associated with the use of actual emissions to calculate the embedded emissions of electricity.

8.4 Joint impacts of the three preferred options

Taken together, the three preferred options – (1) the balanced extension of CBAM to at-risk downstream products with significant climate relevance, (2) the targeted anti-avoidance approach, and (3) the electricity package combining recalibrated defaults with simplified conditions for actual emissions reporting – jointly strengthen CBAM's effectiveness in addressing the risk of carbon leakage and encouraging decarbonisation in a feasible and cost-effective way.

Particularly, the downstream and anti-avoidance preferred options exhibit clear synergies. Both problems are partly driven by CBAM's limited scope (of limited product scope for the specific case of downstream), which creates incentives to substitute domestically produced low-carbon downstream goods with carbon-intensive imports (i.e. downstream carbon leakage), and to slightly transform basic goods outside the EU before import (i.e. CBAM avoidance). The expanded CBAM scope covering steel- and aluminium-intensive downstream goods would address both problems.

In terms of joint trade-offs, the main risk is a cumulative increase in data and verification demands for authorities and some operators as CBAM is extended to selected downstream products. At the same time, actual emission claims for electricity imports become easier. Although the preferred options were chosen in large part for achieving specific objectives at relatively low administrative costs, the package as a whole will need careful monitoring during implementation to ensure the administrative burden remains manageable, aligned with WTO principles, and to inform any future fine-tuning.

Overall, the package yields higher environmental effectiveness than any single strand alone. The balanced downstream extension captures nearly as many EU production emissions at risk of carbon leakage as the broad extension alternative. The targeted anti-avoidance approach focuses enforcement efforts on the biggest avoidance risks, while leaving room for future adjustment as CBAM enters its definitive phase. The preferred option for improving the treatment of electricity imports provides stronger incentives for low-carbon electricity imports.

8.5 REFIT (simplification and improved efficiency)

In line with the REFIT programme, the proposed revision of CBAM aims to strengthen the mechanism's environmental integrity without unnecessary administrative cost, while introducing simplifications wherever possible. Earlier this year, the Commission adopted an Omnibus simplification package, which, among other improvements, introduced a de-minimis threshold exemption of 50 tonnes mass that would keep 99% of emissions still in the CBAM scope, while exempting around 90% of the importers. As detailed in Section 5.1, the baseline used in this impact assessment reflects this far-reaching simplification.

Building on that foundation, the preferred options were selected because they keep the administrative burden low relative to their environmental gains. For the extension to downstream products at risk of carbon leakage, the preferred option scores high on the efficiency indicators and concentrates coverage on high-materiality steel and aluminium products for which obtaining data on actual emissions is more straightforward than for any other downstream goods. For avoidance, the preferred option reflects a targeted approach that focuses enforcement efforts on the highest and most material avoidance risks rather than imposing blanket obligations on all importers. To address the problem of limited incentives to electricity decarbonisation, the preferred option couples recalibrated defaults to acknowledge genuine decarbonisation efforts by grid operators in third countries with simplified conditions for declaring actual emissions. This simplification not only improves the accuracy of the carbon price signal as actual values become easier to report but is also expected to provide legal clarity and reduce the overall administrative burden for importers of electricity.

9 HOW WILL ACTUAL IMPACTS BE MONITORED AND EVALUATED?

The impacts of the preferred options will be monitored with a set of indicators compiled on a continuous basis. Data will come from the CBAM Registry (verified declarations and certificates), other emission statistics, including from the European Environment Agency, customs statistics, and repeated feedback channels with industry, public authorities and third country representatives.

For the downstream extension, the operational objectives are to prevent carbon leakage and thereby reduce GHG globally and incentivise decarbonisation in third countries in an effective and efficient manner. A successful implementation of CBAM is expected to lead to a lower average emission intensity of imported goods, and lower total emissions in sectors covered by the downstream extension. Monitoring will therefore track the average emission intensity of imported goods, the total level of emissions at sectoral level for imported and EU produced products covered by the extension, changes in their import and export levels, the share of declarations relying on default values versus actual emissions reporting, as well as the median reported compliance time and cost per declaration based on stakeholder feedback. Assessment of international trade impacts will also be priority. To support such monitoring and ensure adequate granular data on compliance become available, the Commission will implement large scale surveys open to both EU importers and importantly producers, assemblers and exporters of CBAM goods in third countries. These surveys will be designed to capture the time, effort consequent compliance cost borne by different CBAM actors across the value chain.

For anti-avoidance, the operational objectives are to deter CBAM avoidance via minor transformations of CBAM basic goods, mis-declaration of emission intensities, and abusive practices. Corresponding indicators will include the hit rate of targeted controls, the share of declarations relying on default values versus actual emissions, review of import volumes, review of declared emissions per third country installations, and count of possible cases of abusive practices. These indicators will allow enforcement to remain focused on material checks.

For electricity, the operational objectives are to better reflect the decarbonisation trends in third countries. The impacts will therefore be assessed by observing the emission levels of the power sector in third countries, the level of electricity imports and the declaration of actual values in the CBAM Registry under the definitive period.

Table 14: Monitoring and evaluation indicators

Objectives	Indicators	Measurement tools/data sources	Interpretation
Reduce GHG emissions	– Level of emissions embedded in imported CBAM goods - existing and the proposed extension (in tonnes of CO2) – Level of emissions in the EU for sectors under CBAM (in tonnes of CO2) – Level of emissions globally for sectors under CBAM (in tonnes of CO2)	– Emission statistics – Data from the CBAM Registry – Sector statistics – Statements by 3rd countries on whether CBAM incentivised their own carbon pricing	– Under Art.14(5), aggregated emissions embedded in the imported CBAM goods is measured yearly and should decrease. –

Encourage cleaner production processes in third countries	− Evolution of the average emission intensity of imported products − Evolution of actual emissions for CBAM sectors in 3rd countries − Share of actual values reporting for electricity − Uptake in the reporting of pre-consumer scrap as a precursor	− Level of emissions demonstrated by third country producers subject to the CBAM − Data from the CBAM Registry −	− For electricity: increased share of renewable and decarbonised electricity in the electricity mix of third countries. − Uptake of MRV and/or carbon pricing systems in third countries.
Prevent carbon leakage	− As indicators of emissions above − Level of emissions in the EU relative to global emissions − Trade flows in CBAM sectors − Trade flows downstream	− Emission statistics − Trade statistics − Sector statistics − Data from the CBAM Registry	
Ensure consistency with EU policies	− CBAM certificates price in line with price in the EU ETS	− Statistics from EU ETS and CBAM authorities	−
Limit administrative burden for producers of CBAM goods in third countries	− Share of emissions declared using default values compared actual emissions − Cost of compliance with as a share of overall production costs − Time needed to comply with CBAM monitoring and reporting requirements	− Data from the CBAM Registry − Data from large scale survey on CBAM compliance in third countries	−
Limit administrative burden for importers of CBAM goods	− Timely treatment of CBAM enforcement (e.g. possible reconciliation procedure) − Share of emissions declared using default values compared actual emissions − Time needed to comply with CBAM monitoring and reporting requirements	− Feedback from industry and public authorities responsible for CBAM implementation − Number of staff necessary for CBAM administration −	−

	– –		
Adress the risk of CBAM avoidance	– Share of emissions declared using default values compared to actual emissions – Number of cases of misdeclarations of emission intensities reported by CBAM authorities – Dispersion scores in the heterogeneity in the reporting of emission intensities. – Evolution of other confidential risk management indicators	– Data from the CBAM Registry – Feedback from industry and public authorities responsible for CBAM implementation – Emission statistics – Sector statistics	–