Harmonizing Carbon Accounting in the Steel Industry: Evaluating CBAM Relative to Existing GHG Standards

Jacob Daniels

Executive Summary

Existing greenhouse gas (GHG) accounting methodologies for the steel industry vary substantially in scope and structure, producing materially different emissions figures for the same physical plant. The Columbia Center for Sustainable Investment's (CCSI) study, "*Conflicts Between GHG Accounting Methodologies in the Steel Industry*" (Biberman et al., 2022), demonstrated this variance by applying five widely used methodologies to a hypothetical 7 Mt/yr integrated blast furnace-basic oxygen furnace (BF-BOF) steel plant, yielding an emissions spread from roughly 13.5 to 19.9 million tCO_2e, or approximately a 47 percent difference. This difference is attributable to differences in system boundaries, treatment of coproduct gases, and default emission factors. As of January 2026, the European Union's (EU) Carbon Border Adjustment Mechanism (CBAM), derived from the EU Emissions Trading System (ETS), entered its definitive regime, introducing the first major emissions accounting methodology built as a regulatory mechanism to enforce a border tariff. This paper applies EU CBAM to the same reference plant used in the CCSI study using its mass balance method under Annex III, §B.3.2 of Commission Implementing Regulation (EU) 2025/2547. EU CBAM's results, between 15.8 and 16.5 million tCO_2e depending on the precursor's country of origin and whether the default-value markup is applied, land inside the existing five-method range, between the GHG Protocol and ISO 14404/worldsteel figures. Despite CBAM having a notably less comprehensive system boundary, its default-value markups are extremely conservative and compensate for the omission of the following sources of emissions: mobile combustion, indirect electricity (BF-BOF only), and non-CO_2 gases. Boundary and definitional choices, not measurement differences, are what drive divergence across these methodologies, and CBAM's position in the emissions accounting landscape reflects what it was built for: a trade instrument, not an accounting standard. Complete harmonization across a single boundary is unlikely and is not the right goal. Instead, the standards community, including organizations like ANSI working with their international counterparts, should convene technical workshops to help the growing number of nations building their own CBAMs draw on existing standards rather than overwrite them. Verification and accreditation bodies should pursue mutual recognition to lower compliance costs without weakening rigor. And a technical specification should sit alongside standards like ISO 14067, encoding sector-specific rules and updating faster than the underlying standards themselves.

Introduction

As of January 2026, the European Union's Carbon Border Adjustment Mechanism (CBAM) entered its definitive regime, shifting product-level greenhouse gas (GHG) accounting from voluntary corporate disclosure to a mandatory mechanism in international trade. As nations seek to establish a harmonized global accounting and reporting product standard under the ISO–GHG Protocol Joint Working Group as mandated by the COP30 Presidency (GHG Protocol, 2026), the EU CBAM's methodology is poised to become the de facto standard in product carbon footprint (PCF) accounting. While other nations are beginning to implement their own CBAMs, each additional methodology introduces further complexity and overhead into the product carbon footprint accounting space, a space which already has myriad scientifically valid accounting methods.

CBAMs are here to stay: in the EU, an importer may deduct any carbon price already paid in the country of origin from the CBAM certificates owed at the EU border (Regulation (EU) 2023/956, art. 9). A country with no domestic carbon price forfeits that deduction entirely: its exporters still bear the cost of emissions, but the revenue accrues to the EU rather than to the exporting country's own treasury. A country that adopts its own carbon pricing mechanism, by contrast, retains that revenue domestically while its exporters' EU CBAM liability falls accordingly. This asymmetry creates a structural incentive for trading partners to adopt their own carbon border or carbon pricing mechanism to keep revenue that would otherwise leave the country, independent of any climate policy preference.

Proliferation of CBAMs compounds, rather than solves, two problems that already make GHG accounting in heavy industry difficult to compare across jurisdictions. The first is that there are simply too many accepted accounting methodologies. The International Energy Agency's Emissions Measurement and Data Collection for a Net Zero Steel Industry report identified five key emissions measurement methodologies for the steel sector alone, governed by three different standard-setting bodies (ISO, the World Steel Association, and ResponsibleSteel), each developed for a different purpose and none originally designed for interoperability with the others (International Energy Agency [IEA], 2023). Existing accounting methodologies differ in scope and require different data to be collected, increasing costs significantly when exporters have to comply with multiple frameworks.

The second, and more consequential for trade policy, is the limited interoperability and comparability of existing methodologies. The Columbia Center on Sustainable Investment's (CCSI) comparison of five widely used steel GHG accounting methods, applied to one hypothetical integrated steel plant producing 7,000,000 metric tons of crude steel per year, found an emissions spread from roughly 13.5 to 19.9 million tCO_2e, or approximately 47 percent (Biberman et al., 2022). Consequently, the same physical plant can be scored either as a high emitter or as a comparatively low emitter, depending only on which legitimate accounting method is applied to it.

Even when applying the same accounting methodology, discrepancies in reported emissions remain. In a real-world comparison of installation-level carbon intensity data, the Organisation for Economic Co-operation and Development (2025) found an average discrepancy of approximately 25 percent between two independent data providers measuring the same facilities. This spread highlights the degree to which on-paper calculated emissions can deviate from real-world emissions and underscores the need for verification bodies to provide independent assurance that reported emissions faithfully represent actual emissions and comply with the applicable reporting standard.

This need for independent verification carries significant compliance implications. To improve the credibility of reported emissions, EU CBAM Annex VI requires accredited verifiers to conduct installation visits as part of the verification process (Regulation (EU) 2023/956, Annex VI). While these requirements strengthen confidence in the validity and accuracy of reported emissions, they also increase administrative burden and compliance costs for exporters. As more jurisdictions adopt CBAMs with their own verification requirements, these costs are likely to skyrocket unless product-level GHG accounting and verification practices become more harmonized.

As CBAMs become more widespread, interoperability and harmonization between accounting and verification standards will be essential to ensure markets function effectively. This challenge is precisely what the ISO-GHG Protocol Joint Working Group was established to address (GHG Protocol, 2026). The group is currently developing a harmonized product-level GHG accounting standard that builds on both ISO 14067 and the GHG Protocol Product Standard, to support mechanisms such as EU CBAM while reducing methodological fragmentation. CBAM's relationship to existing steel sector GHG accounting methods has not been assessed. This paper addresses that gap by adding CBAM to the CCSI dataset and comparing its reported emissions, system boundaries, and treatment of indirect emissions with the five methods examined in the original study. This paper then uses the findings to discuss major differences between CBAM and existing methodologies, and provides thoughts for how the standards community can help harmonize the accounting landscape.

The Landscape of Steel GHG Accounting Methodologies

The starting point for this report is the Columbia Center on Sustainable Investment's (CCSI's) 2022 report, produced under the Coalition on Materials Emissions Transparency (COMET) initiative. The CCSI examined seven methods spanning national, corporate, and facility level accounting purposes: the Environment Canada guidance manual, the EU ETS Monitoring and Reporting Regulation, the GHG Protocol's Corporate Standard and Iron and Steel guidance, the IPCC's national inventory guidelines, the ISO 14404 series, ResponsibleSteel's standard, and the World Steel Association's (worldsteel) CO_2 methodology (Biberman et al., 2022). Across the seven accounting methodologies, the report identified systematic divergence in system boundary definitions, allocation of emissions associated with coproduct gases, treatment of non-CO_2 gases such as methane and nitrous oxide, and in the accounting of purchased and site-generated electricity. Emissions accounting methodologies such as the IEA's Near-Zero Emissions Steel and Low-Emissions Steel that use a sliding scale (where the "green factor" is tied to the percentage of recycled steel) were not considered, as CBAM does not operate this way.

CCSI narrowed the seven method comparison down to the five methods with sufficiently complete guidance to support a calculation: Environment Canada, GHG Protocol, ISO 14404, worldsteel, and ResponsibleSteel. Each method was then applied to a single hypothetical 7 Mt/yr blast furnace, basic oxygen furnace (BF-BOF) steel plant, with resulting emissions between 13.5 and 19.9 million tons of CO_2e/yr (Biberman et al., 2022). The report attributes the spread to three main factors: system boundaries being notably different, causing the inclusion or exclusion of myriad indirect emissions from imported materials and energy, the inclusion or exclusion of mobile emissions from on-site equipment, and variability between methods of default emissions factors. This spread is not a measurement error or an artifact of poor data quality, but an artifact of methodological deviation.

The community as a whole does not fully agree on how to address this divergence. The CCSI's report suggests convergence towards a harmonized carbon accounting framework, favoring a single fixed system boundary that is applied consistently across the industry to bridge disparities between methods (Biberman et al., 2022). The IEA takes a different approach, suggesting that while harmonization is ideal, interoperability should be the bar for regulatory success between different methodologies (International Energy Agency [IEA], 2023).

Germany's Low Emission Steel Standard (LESS) offers a concrete illustration of interoperability between methods. Developed by WV Stahl, the German Steel Association, LESS emerged from a stakeholder process convened by the German Federal Ministry for Economic Affairs and Climate Action (BMWK), with its governance formalized in October 2024 under a dedicated non-profit entity, LESS aisbl (Blanco Perez et al., 2025). The standard adopts the IEA's near-zero and low-emissions steel framework as its foundational principle, but with a more comprehensive boundary. Whereas the IEA's sliding-scale approach terminates at crude steel production, LESS extends its system boundary downstream to encompass refining, casting, and hot rolling, and incorporates partial surcharges to capture Scope 3 emissions sources, most notably alloying agents, that fall outside the IEA's accounting boundary (Blanco Perez et al., 2025). These surcharges are derived by BMWK's technical committee and yield an addition of 120 kg CO_2e per tonne of rolled quality steel and 70 kg CO_2e per tonne of rolled structural and reinforcing steel (Blanco Perez et al., 2025).

LESS should therefore be understood not merely as a surcharge appended to the IEA method, but as a boundary extension coupled with a fixed Scope 3 addition. This distinguishes it from CBAM's markup mechanism, which scales with a manufacturer's reliance on default values in the absence of site-level data rather than applying a uniform per-tonne addition irrespective of actual performance. The fixed nature of the LESS surcharge constitutes its principal limitation as a model for interoperability: because the surcharge is fixed at a single calibrated value, a producer that achieves actual reductions in Scope 3 emissions, for instance, through lower-carbon alloying inputs, receives no corresponding reduction in its assessed surcharge. LESS thus achieves a form of interoperability with the IEA's sliding-scale logic, but only by decoupling the surcharge from the underlying emissions performance it purports to represent.

CBAM as a Case Study in the Landscape

EU CBAM is derived from the EU Emissions Trading System (ETS). As such, it has different boundaries than life cycle assessment methodologies such as ISO 14067. Consequently, its system boundaries are designed for regulatory emissions accounting rather than cradle-to-gate or cradle-to-grave product carbon footprint accounting. CBAM defines system boundaries per aggregated goods category, specifying which processes fall inside the production boundary for a given product and production route.

For basic oxygen steelmaking, under the crude steel category, the Commission Implementing Regulation (EU) 2025/2547 requires monitoring of all processes directly or indirectly linked to a) the production processes emitting CO_2 from fuels and waste gases, b) the production processes emitting CO_2 from process materials, and c) carbon entering the process in scrap, alloys, etc., and carbon remaining in the product or in slags or wastes, taken into account by using a mass balance method in accordance with point B.3.2 of Annex III (Commission Implementing Regulation (EU) 2025/2547). To summarize, the system boundaries cover Scope 1 (direct) emissions, indirect emissions for goods not listed in Annex II to Regulation (EU) 2023/956, and the embedded emissions of any precursor that is used in the production process (Commission Implementing Regulation (EU) 2025/2547). BF-BOF steel is included in Annex II, and therefore only direct emissions from the plant and embedded indirect emissions from materials are covered.

For the case study in this paper, the boundary included the following: a) direct emissions from fuels and reducing agents including coal, natural gas, and fuel oils, b) embedded emissions from processed materials such as iron pellets, and c) emissions credits from waste gases such as coke oven gas, blast furnace gas, converter gas, and embedded carbon in the final product. This scope is deliberately narrower than a full corporate or product life cycle accounting framework. As stated in Commission Implementing Regulation (EU) 2025/2547, emissions from mobile machinery used for transportation purposes are excluded. Another notable exclusion of emissions is indirect electricity emissions. While BF-BOF production is not heavy on electricity usage when compared to Electric Arc Furnace (EAF) steel production (where, under CBAM, indirect emissions from electricity are not omitted), it is still a non-trivial source of emissions.

Precursor accounting introduces a further layer of specificity. Only input materials formally listed as relevant precursors within the system boundary of a production process are included in the calculation of embedded emissions (Regulation (EU) 2023/956, art. 7). Operators are required to obtain embedded emissions data from suppliers of purchased precursors and where actual data cannot be had, default values published by the Commission may be used based on CN codes and the country of origin (Commission Implementing Regulation (EU) 2025/2621). For the reference plant modeled in this study, the CN code classifications of both the finished good and its precursor materials were used to determine appropriate default emission factors.

CBAM is a hybrid instrument; it is narrower than a full life cycle assessment in its treatment of indirect emissions and exclusion of mobile emissions and finishing processes, although it is significantly more prescriptive than other corporate disclosure frameworks to prevent carbon leakage and create a level playing field for EU imports.

Methods: Deriving Reported Emissions Under CBAM

The Carbon Border Adjustment Mechanism (CBAM) was applied as a sixth methodology to the integrated blast furnace/basic oxygen furnace (BF-BOF) plant modelled by Biberman et al. (2022), holding the plant's production characteristics fixed such that any divergence in reported emissions is attributable to methodological rather than physical differences. The plant produces 7,000,000 tons of crude steel annually and operates onsite coke, sinter, lime, and power facilities.

Under CBAM, the final good was classified as crude steel (CN 7207), and emissions were attributed to a single joint production process using the bubble approach that the definitive monitoring rules permit for integrated installations whose intermediate products are wholly consumed onsite (Regulation (EU)

2023/956, Annex IV; Commission Implementing Regulation (EU) 2025/2547, Annex III). The system boundary terminates at the basic oxygen furnace, excluding downstream rolling, casting, and coating, consistent with the declared crude steel output. Because CBAM reporting for the iron and steel sector counts direct emissions only in the definitive period (with an exclusion for electric arc steel production), indirect emissions from electricity were excluded throughout.

CBAM's treatment of precursors differs significantly from the five methodologies already examined. For the BF-BOF route, the only precursor material carrying embedded emissions present at the modeled plant is iron ore pellets, categorized as CN 2601 12 00, agglomerated iron ores and concentrates, excluding roasted iron pyrites (Regulation (EU) 2023/956). In contrast, coke is not a CBAM good, so the imported metallurgical coke and the onsite coke produced from imported coking coal carry no embedded precursor emissions; their carbon is instead captured within the plant's direct mass balance as it is oxidized through combustion.

Precursor embedded emissions were assigned using CBAM country default values rather than supplier-specific data, since no primary data for the pellet source were available. Two origins were modelled in parallel, China and Japan, drawing on the default values for CN 2601 12 00 published in Commission Implementing Regulation (EU) 2025/2621. China and Japan were picked because they are the two largest steel exporters (World Steel Association, 2025).

To remain consistent with the definitive-period exclusion of indirect emissions, the direct default value was used as the base (0.200 tCO_2/t for China and 0.160 tCO_2/t for Japan), and the 2026 mark-up of 10 percent was applied to the direct base emissions value, giving effective factors of 0.220 and 0.176 tCO_2/t, respectively, for pellet embedded carbon (Commission Implementing Regulation (EU) 2025/2621). The published mark-up columns in the regulation are computed on total (direct plus indirect) emissions; applying the mark-up to the direct base alone preserves the correct definitive-period scope; this is noted for transparency.

The plant's own direct emissions were determined using a calculation-based carbon mass balance in which the measured fuel and import quantities, if not already in mass quantity, were converted to mass using density, then to energy using the net calorific value (NCV), and finally to CO_2 emissions by using the applicable energy-based emission factor. In the case that the material did not have an associated emissions factor, the carbon content was calculated using stoichiometry and was added to the mass balance accordingly. Standard calculation factors were taken from the guidance Annex D, which reproduces the 2006 IPCC default net calorific values and emission factors adopted in Annex VIII of the Implementing Regulation (Commission Implementing Regulation (EU) 2025/2547), and other sources were used and cited when IPCC data were unavailable. The calculations were done in accordance with the mass-balance method demonstrated for integrated steelworks in the CBAM guidance (European Commission, Directorate-General for Taxation and Customs Union, 2023). Additionally, export credits for waste gases were granted at a correlation factor of 0.667 as directed by CBAM legislation (Commission Implementing Regulation (EU) 2025/2547, Annex III), and the carbon retained in the product was credited at the 1.25 percent carbon content specified in the case study construction (Biberman et al., 2022, Appendix VII). An overview of the plant inputs and results of the case study is provided below:

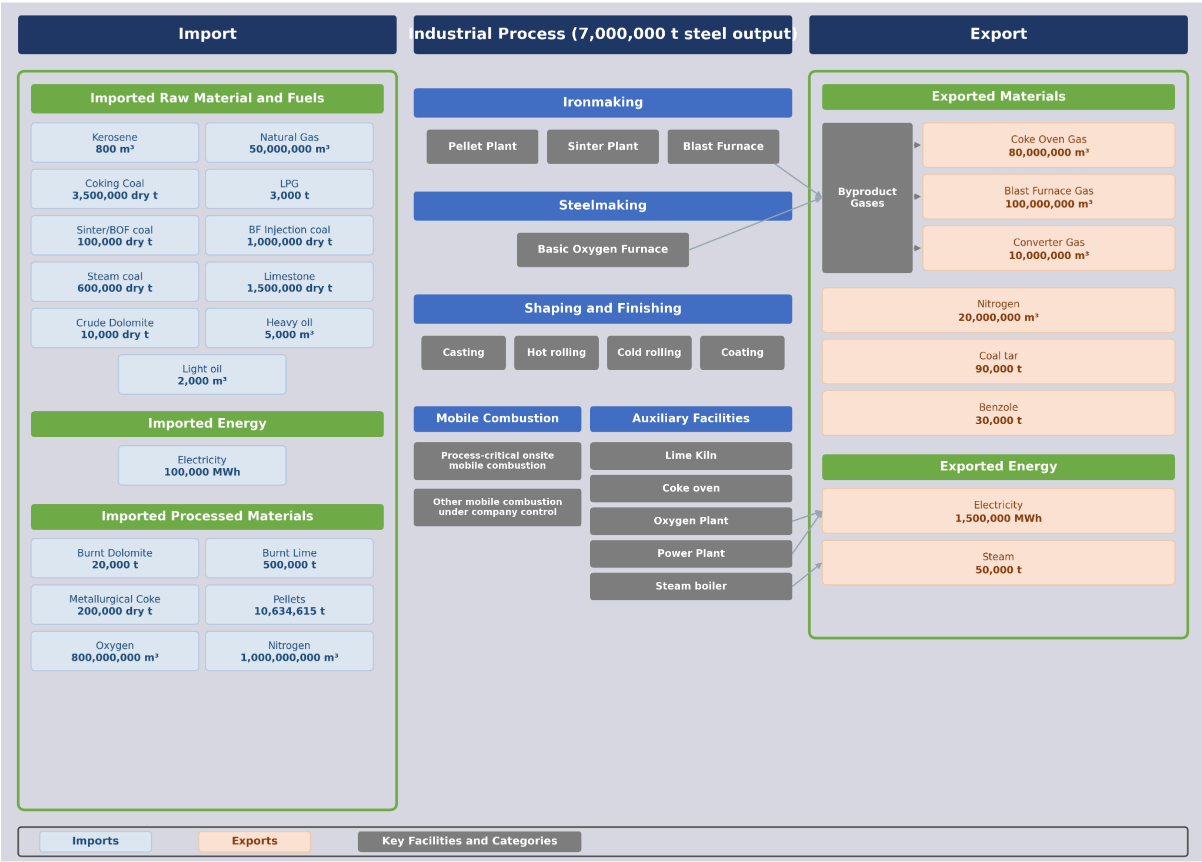

Figure 1: Simplified Inputs and Outputs for a Steel Plant
Source: Biberman et al. (2022).

tCO_2e Emissions Category	ISO 14404	Worldsteel	Environment Canada	GHG Protocol	Responsible Steel	CBAM (China) (markup)	CBAM (Japan) (markup)	CBAM (China) (methodology only)	CBAM (Japan) (methodology only)
Onsite Stationary Processes	16,863,987	16,866,287	13,579,633	15,365,804	16,345,458	14,915,049	14,915,049	14,915,049	14,915,049
Process-Critical Onsite Mobile Combustion	N/A	N/A	55,738	55,738	N/A	N/A	N/A	N/A	N/A
Other Mobile Combustion under Company Control	N/A	N/A	N/A	36,927	N/A	N/A	N/A	N/A	N/A
Credit from Byproduct Gas Export	-99,360	-108,320	-103,620	-200,200	-98,049	-76,929	-76,929	-76,929	-76,929
Net Indirect Emissions from Other Materials	1,977,212	1,979,284	N/A	378,675	3,569,255	2,339,615	1,871,692	2,126,923	1,701,538
Net Indirect Emissions from Energy	-715,350	-715,350	N/A	47,157	50,400	N/A	N/A	N/A	N/A
Credit from Embedded Emissions in Final Products	N/A	N/A	N/A	N/A	N/A	-713,997	-708,800	-713,997	-708,800
Total tCO_2e Emissions	**18,026,489**	**18,021,901**	**13,531,750**	**15,684,101**	**19,867,063**	**16,463,738**	**16,001,012**	**16,251,046**	**15,830,858**

Table 1: Comparison of Calculated Emissions in tCO_2e from 7 Mt Steel Plant

Source: Biberman et al. (2022), Figure 3; Biberman et al. (2022), Table 12; CBAM columns filled by author.

Note: Credit for Embedded Emissions row only applies to CBAM as it is the only method in the study which was calculated using a mass balance.

Emission Source	Environment Canada	EU ETS	GHG Protocol	IPCC	ISO 14404	Responsible Steel	Worldsteel	CBAM
Stationary Combustion Emissions								
Electricity Generation	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Reheating Furnaces	Yes	No	Yes	Yes	Yes	No	Yes	Yes
Coke Production	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes, but in mass balance
Flaring Of Coproduct Gas	Yes	Yes	Yes	Yes	N/A	No	N/A	Yes
Biomass	No	No	Yes	Yes	N/A	Yes	Yes	Fuel: Yes. Process Input: No
Process-Related Emissions								
CO_2 From Lime Production	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
CO_2 From Pellet Production	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
CO_2 From Sinter Production	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
CO_2 From Dri Production	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ch4 From Sinter Production	No	Yes	Yes	Yes	No	Yes	No	No
Ch4 From Pig Iron Production	No	Yes	Yes	Yes	No	Yes	No	No
Ch4 From Dri Production	No	Yes	Yes	Yes	No	Yes	No	No
Fugitive Emissions	No	Yes	Yes	Yes	No	N/A	No	No
Indirect And Other Off Site Emissions								
Production Of Imported Materials	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes, if CBAM good
Electricity Consumption	No	No	Yes	Yes	Yes	Yes	Yes	No
Off Site Mobile Combustion	No	No	N/A	N/A	No	Yes	No	No
Onsite Mobile Combustion	Yes	No	Yes	Yes	No	Yes	No	No

Table 2: Comparison of Emission Sources Source: Biberman et al. (2022); CBAM column added from Regulation (EU) 2023/956, Annex II; Commission Implementing Regulation (EU) 2025/2547; European Commission, Directorate-General for Taxation and Customs Union (2023)

Methodology	Creditable Emission Sources
Environment Canada	Not specified.
EU ETS	Exported electricity does not give rise to credits. No other credit type is specified.
GHG Protocol Iron and Steel	Does not define credit for steel in particular, but clarifies in general that emissions associated with the sale of own-generated electricity to another company are not netted from direct emissions and may be reported in optional information.
ISO 14404 series	Raw materials, intermediate products, and energy exported to outside users as credit emission sources: gas fuel, liquid fuel, and solid fuel; auxiliary material (e.g., limestone and crude dolomite); energy carriers (e.g., electricity, steam); ferrous-containing material (e.g., pellets and sinter); alloys (e.g., ferro-nickel); product and by-product (e.g., CO_2 for external use, coal tar, and benzol).
ResponsibleSteel	Credits may only be claimed for exported intermediate products when they have been purchased in excess, or when intermediate energy products that have not played a role in crude steel production are exported. Netting is otherwise not permitted. Reductions from Carbon Capture and Storage (CCS), whether onsite or offsite, may only be claimed when justification can be provided that emissions will be captured permanently and monitored for leakage; leakage must be reported and added to the producer's emissions intensity in the year it occurs. Credits may be assigned for biomass inputs based on carbon sequestered during growth, but only when accompanied by an accounting of GHG emissions from land-use changes and management for the 20 years prior to harvest.
Worldsteel	Four credit emission sources: blast furnace slag, basic oxygen furnace slag, electric arc furnace slag, and CO_2 to external. CO_2 to external is scope 1; the other three belong to scope 3. Credits are related to procurement or delivery of pre-processed materials or coproducts from the site, without further detail specified.
CBAM	Provides specific, formula-driven credits for two exported flows within the system boundary: Exported heat subtracted from direct emissions and exported waste gases calculated using a fixed natural gas equivalent emission factor combined with an efficiency correction factor of 0.667. Additionally, if using a mass balance, embedded carbon in the final product can be subtracted.

Table 3: Creditable Emission Sources Source: Biberman et al. (2022). CBAM row added by author.

Results, Discussion, and Thoughts for the Standards Community

Applied to the CCSI reference plant, CBAM produces total reported emissions of 16,463,738 tCO_2e (China origin, with 2026 markup), 16,001,012 tCO_2e (Japan origin, with markup), 16,251,046 tCO_2e (China, methodology only, no markup), and 15,830,858 tCO_2e (Japan, methodology only). All four figures fall within the range of the five existing methods, which spans roughly 13.5 to 19.9 million tCO_2e (Biberman et al., 2022). CBAM results sit near the middle of the spread, which is noteworthy given its narrower scope and its reliance on conservative default values.

CBAM tracks closely with the other methods on onsite stationary processes. This is unsurprising: for BF-BOF steel, CBAM's boundary effectively comprises Scope 1 emissions plus a small set of specific Scope 3 items, and Scope 1 emissions are extremely clear in terms of how they are approximated. Where CBAM begins to diverge is in what it leaves out. The first omission is mobile emissions; while their absence is immaterial to the total, contributing less than one percent to total emissions even in the methods that do count them, mobile emissions would not be difficult to approximate. A rough mass balance of fuel entering onsite vehicles could produce a defensible estimate without requiring new data infrastructure.

A more consequential source of divergence is byproduct gas export crediting. Under CBAM, all exported waste gases, regardless of their actual composition, are credited using the standard emission factor for natural gas, scaled by a fixed efficiency correction factor of 0.667 (Commission Implementing Regulation (EU) 2025/2547, Annex III, Equation 54). This is a meaningfully different approach from the other five methods, which generally credit byproduct gases using gas-specific factors rather than a single reference-fuel proxy, and creates a noticeable decrease in the quality of an EU CBAM-based emissions declaration.

CBAM's treatment of indirect emissions is a further, larger omission. Electricity consumed in BF-BOF production is currently excluded from CBAM's definitive-period boundary entirely. This is not a trivial gap: EPA estimates that indirect emissions from electricity use account for roughly 12 percent of total facility emissions in integrated steelmaking (U.S. Environmental Protection Agency, 2012). Notably, recycled electric arc furnace steel production is not granted the same exclusion for indirect emissions.

Additionally, non-CO_2 GHG emissions are not counted for iron and steel under EU CBAM. While these are not primary emissions in the iron and steel sector, many non-CO_2 GHGs have significantly higher global warming potential (GWP) per unit of emissions, and their omission has a larger climate impact than their mass share suggests.

Interviews conducted for this paper point to a second, distinct barrier alongside methodological fragmentation: acquisition of accurate data. Importers now need installation level, product specific, third party verified emissions data from their suppliers. Many suppliers, particularly those outside of the EU, are inexperienced in accounting for emissions at this level of granularity. Fragmented standards compound this problem, but acknowledging the fact that data acquisition is a large barrier, regardless of methodological choice, is important.

Carbon border adjustment mechanisms are policy-driven and therefore are political in nature. Specifically with CBAM, the penalty for using EU-provided default emission factors rises to 20% in 2027 and 30% in 2028 (Commission Implementing Regulation (EU)

2025/2621), a schedule that functions as an escalating incentive against reliance on defaults rather than a stable emissions estimate. Even so, the standards community has a role to play in preventing further fragmentation, both in the underlying accounting standards and in verification. Organizations such as ANSI, working alongside their international counterparts, could convene technical workshops that help nations that are creating their own CBAMs build off of existing standards rather than compete with them. To verify emissions, CBAM requires installation visits by accredited verifiers as part of the compliance process (Regulation (EU) 2023/956, Annex VI, art. 18). Greater coordination among verification and accreditation bodies, particularly through mutual recognition, could meaningfully lower this compliance burden without weakening the rigor that a CBAM type certificate is expected to carry.

Countries are unlikely to converge on a single system boundary for emissions accounting, and complete harmonization is not the goal. A more realistic path forward is a new technical specification that sits alongside existing standards (such as ISO 14067) rather than replacing them, built to encode sector-specific rules and capable of being updated on a faster cycle than the underlying standards themselves. A technical standard such as this could serve as a shared reference point for regulatory carbon footprint calculations, giving the growing number of CBAMs a common technical basis and data quality/availability floor without forcing every jurisdiction to adopt the same accounting boundary.

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