

CREDIBLE EMISSIONS REPORTING: OPPORTUNITIES FOR IMPROVED ALLOCATION IN EMISSIONS TRADING SYSTEMS

By

InterWork Alliance (IWA) Carbon Emissions Token (CET) Taskforce^{1,2}

In this paper, the Carbon Emission Token (CET) Taskforce discusses the evolution of today's Carbon Compliance Markets (CCMs) and explores the transformative role CET could play in enhancing these markets, specifically around carbon accounting and reporting in Emissions Trading Systems (ETSs) and cross-jurisdictional carbon leakage. Key takeaways include:

- Advances in digital Monitoring, Reporting and Verification (dMRV) and related tools can play a role in addressing systematic inaccuracies in carbon emissions reporting
- A CET can facilitate reporting transparency within a CCM, as well as identifying the embodied emissions in international trade referenced across markets to address carbon leakage.

Emissions Trading: A Climate Mitigation Success Story

Since the Paris Agreement in 2015, carbon-pricing initiatives, such as national carbon taxes and regional emissions trading systems (ETSs), have stood as a success story in the fight against climate change. The EU ETS, for example, the largest and longest-running cap-and-trade system in the world, has achieved an estimated 1 billion tonnes of greenhouse gas (GHG) emissions avoided between 2008 and 2016.³ There are [29 other ETSs in force](#) as of this writing, with over a dozen more under development or under consideration. In 2022, they collectively traded over [\\$900B](#) in permits and brought sectoral emitters responsible for ~17% of global emissions under regulatory scrutiny.

Market-based decarbonization approaches such as these are not a panacea. They are one tool in a multi-pronged strategy to reduce carbon on a global scale, but demonstrably an important one. If widely reported gaps between actual emissions and Paris Agreement reduction targets set for 2030 can't be narrowed in time – and less than seven years remain to do so – we are unlikely to succeed without pricing carbon to leverage the power of markets to drive behavioral change.

Last year, [46 countries](#) and [33 supra and sub-national jurisdictions](#) operated carbon pricing mechanisms, collectively reaching [~30% of global emissions](#). Under a carbon tax, regulators establish a fixed rate that businesses subject to the tax must pay for each tonne of CO₂e they emit. Conversely, a cap-and-trade system distributes a limited number of carbon emissions “allowances”

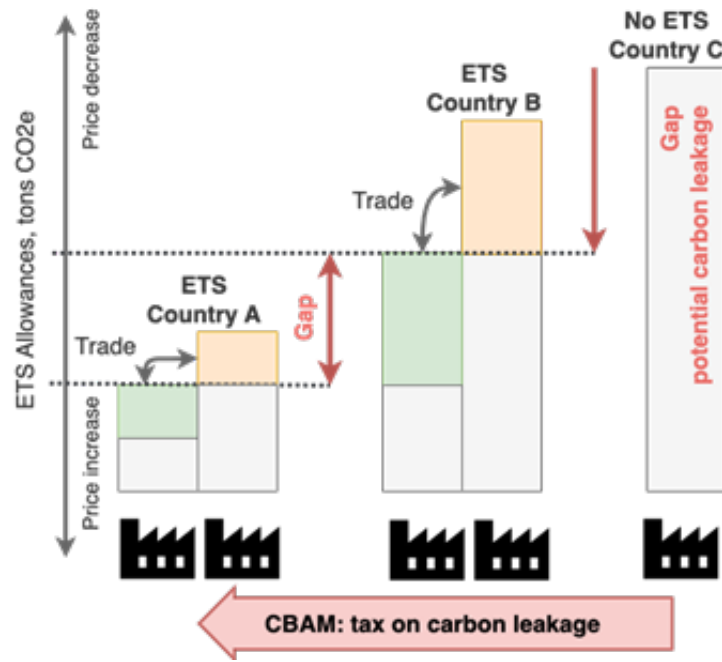
1 This paper was authored by members of the Global Blockchain Business Council and InterWork Alliance's Carbon Emissions Token Taskforce. If you would like to get involved with the Taskforce or want more information, please contact iwa@gbbccouncil.org.

2 The views expressed in this paper do not necessarily reflect the views of the individual taskforce members or the organizations they represent.

3 <https://www.nature.com/articles/s41598-023-28154-6#:~:text=Statistical%20evidence%20shows%20that%2C%20between,such%20as%20California%20and%20Massachusetts.>

– either by free allocation or primary market auction – to covered businesses. Figure 1 offers a simplified view of how the ETS markets function. It depicts three countries with emissions allowances assigned to industries in country A and B (dashed lines) that produce added-value products, such as steel or cement.

Figure 1. Overview of ETSs and their inefficiencies:



Source: Authors

As illustrated, the overall supply of allowances is designed to fall over time, with each allowance authorizing one tonne of emissions. Industries emitting less CO₂e than their allocations permit (green boxes) can then sell that surplus to covered businesses with excess emissions (orange boxes). Unused or unallocated allowances can be traded on secondary markets using both spot or derivatives contracts (futures, options, swaps, etc.). The intent is to leverage supply and demand to empower ETS participants to find the optimal use of their decarbonization resources with their sectorial and industry contexts. As the supply of allowances falls (or demand increases) prices tend to rise, increasing the incentive to decarbonize. In contrast to a tax, which sets a predefined price, an ETS relies on price discovery catalyzed through the trading of allowances at market rates to keep regulated entities within their pre-allocated carbon budgets.

Addressing Methodological Challenges To Optimize Performance

These CCMs face two core challenges: (1) how to ensure accurate, consistent, and transparent emissions reporting within the ETS; and (2) how to manage the potential for carbon leakage, the phenomenon where industries move their operations – and in turn emissions – to foreign jurisdictions that lack, or less effectively enforce, carbon pricing mechanisms. Since climate change is a global problem, such regulatory arbitrage directly undermines the objective of an ETS. A robust ETS must find ways to price emissions outside of its jurisdictional boundaries and ensure emissions are accurately and transparently reported internally and externally. This is the purpose of the EU's proposed carbon border adjustment mechanism (CBAM). Represented by the trade balancing arrows at the bottom of Figure 1, this is a solution approved by the European Commission to address carbon leakage in the EU ETS. It taxes embodied emissions of imported goods at a rate equivalent to the price of allowances auctioned in the ETS.

As an unintended consequence, countries without an ETS could become a magnet for high-polluting industries operating in jurisdictions with an ETS. Although environmentally counterproductive, it becomes economically rational for businesses in Countries A and B to offshore their facilities to Country C and re-import the final goods. Inefficiencies such as this make it harder to more closely match allocations with emissions, which is the animating purpose of an ETS in the first place, as the Figure illustrates with red shading.

As the carbon markets evolve, like all markets, they undergo transformations which improve rates of success in overcoming major obstacles. Current emission accounting methodologies and verification practices provide solutions to the twin problems of reporting and leakage, which cap-and-trade markets around the world converge on. These solutions are deemed sufficient to address. Yet, a policy effective at managing yesterday's problem can quickly look wanting in light of tomorrow's circumstances, and, in the fight against climate change, the stakes are rising fast. Both the accuracy and consistency with which regulated emissions are measured, and the degree of openness and transparency with which those results are disclosed to the public, can now be improved.

It is important to improve measurement inaccuracies and disclosure to ensure that CCMs continue to thrive, especially as public scrutiny of all climate change regulatory policies increases. ETS administrators are dependent on covered businesses demonstrating compliance by surrendering allowances – or, where permitted, offset credits – equal to self-reported annual emissions. Self-reported historical emissions are also commonly used to calculate baseline allowances. While most ETSs require verification performed by an accredited independent third-party, which provides a credible guard rail for the market, that typically only reveals departures from an established monitoring plan. Where that plan is less robust in applied MRV and methodology, the ETS may inadvertently over-allocate allowances, and, in so doing, fail to set a carbon budget sufficiently constrained to incentivize reductions. An ETS that fails to provide open, transparent reporting of on-going emissions may be unable to detect and deter behaviors at high risk for carbon leakage. In both scenarios, efficient and effective carbon price discovery in the CCMs would be at risk. Using best available methodologies and maximizing transparent public reporting of the results achieved is also critical to the success of complementary policies such as the EU's CBAM.

Implementing New Solutions Enabled By Emerging Tech: CET

How, then, with no bank, asset manager, or corporation unaffected by carbon regulations proliferating across the world, can we help to deliver carbon reporting that is transparent, auditable, and delivered in a more timely manner? Part of the solution: tokenized carbon emissions with linked digital measurement, reporting, and verification (dMRV). New tools are needed to rise above the historical snapshots vulnerable to systematic under-estimation of carbon production, as well as to reduce the moral hazard created when businesses are free to use opaque reporting standards.

Improving Emissions Accounting and Reporting Accuracy and Transparency. While some ETSs may ask for direct measurement using continuous emissions monitoring systems, this is not always possible in practice. Regulated entities are usually instructed to estimate their annual carbon footprint based on emissions factors and manually collected activity data. This is generally sufficient. In concept, the scope 1 emissions targeted by ETSs are not challenging to estimate with precision, assuming in practice the methodologies used to do so are sound and implementation occurs without incident. By contrast, emerging plans to start adding harder-to-measure direct emissions such as methane leakage, or the indirect emissions of imported goods as is required under the EU's CBAM, warrant improvements in both accounting and reporting systems.

These can include incorporation of automation, remote sensing instruments, machine learning, IoT, nested accounting, public ledgers, or other modern digital MRV tools. Not all estimates-based methodologies for calculating emissions are created equal. One may involve rigorous analysis of a company's granular spending data, while the next may depend on a highly generalized average of emission intensity that ignores local variations in geography, technology stack, or operational practices. Still another may be over-reliant on incomplete or expired data, or it may derive its emissions factors from obsolete technology. Estimates may also be inherently easier to manipulate versus direct measurement, whether intentionally or inadvertently. And, of course, climate science is continuously improving; it is not uncommon for significant gaps to be identified between emissions as estimated versus measured directly, as has occurred in other contexts.

Certainty in how a company regulated under an ETS is reporting its emissions is crucial to maintaining the confidence in that ETS as a tool for combating climate change. If historical emissions are inflated, too many allowances will be issued; if annual emissions are undercounted, excess emissions will be hidden; if MRV requirements merely seek to verify compliance with specified methodologies, weaknesses inherent in those methods will be exploited by regulated entities to delay emissions reductions. While the VCM's flaws have drawn more attention, the VCM was less than \$2B in 2021, with just 116M tonnes of CO₂e in trade and only 0.3152% of global emissions covered. By contrast, the world's ETSs, of which there are currently 29 in force, had \$909B in deal flow, encompassing 17% of global emissions.

Scaling an effective and politically acceptable ETS across multiple jurisdictions requires both effective internal measurement and reporting, and coordination with external markets to address carbon leakage. What role can CET play in achieving this? First, CET is presented as a tool to advance reporting transparency internal to a CCM referencing across different markets. It is not being proposed as a mechanism for the trading of allowances under an ETS. The focus is on using CET as a public registry of the scope 1 emissions of a business to compare against available ETS allowances, and help regulators coordinate trade.

Table 1. Positioning of CET within an ETS:

	Organizational scope (direct emissions)	Product scope (embodied emissions)
Internal to ETS	Credible identification of allowance surplus and deficits	Credible identification of internal ETS allowances an importer must purchase
External to ETS	Reference ETS allowances and transactions made by organizations in external markets/geographies	Reference of the carbon footprint of products sourced from an external jurisdiction

Table 1 summarizes different options for positioning CET based on both internal and external factors of a CET, as well as organizational and product value chain emissions.

For an example of internal positioning related to the organizational scope, consider the EU Emission Allowances (EUAs) used in its regional ETS. At the close of the reporting cycle, an organization can trade excess EUAs. CET could be used to facilitate the discovery of an organization's EUA surplus or deficit. Verified CET data would support the credible discovery of internal trading rights or obligations of companies. Using a CET to publicly report inventories referenced by an ETS could also facilitate the disclosure of methodologies used by different organizations, as well as assess the quality of data used as a basis to determine a company's budgeted allowance and organize trade.

Improving Carbon Leakage Detection and Prevention. CET can play an even more impactful role in identifying gaps and potential carbon leakage resulting from activities external to a single ETS. This deals specifically with the pricing of embodied emissions in the trade of international goods, such as under the EU CBAM. The CBAM integrates externally sourced goods into the EU ETS, requiring importers to pay a tariff for the applicable embodied emissions equal to the price of EUAs. It includes provisions that allow importers to discount the number of allowances they must purchase. For example, an importer that sources goods, such as cement, produced by a business in China is subject to its own national ETS.

Such cross jurisdictional accounting is one design feature to avoid CBAM being labeled as a barrier to trade under WTO rules. This includes exceptions under the General Agreement for Tariffs and Trade (GATT) for the protection of the environment.⁴ CET records can be used to reference payments made by organizations in different regional carbon markets. These records can be used in conjunction with cross-border taxation mechanisms, like CBAM, to assist importers reported environmental costs paid in the source country in accordance with GATT exceptions.

Managing carbon leakage under CBAM requires tracking embodied emissions beyond organizational accounting. This is a particular use case for the CET under a product life cycle scope. This covers the tracking of emission records under the product life cycle approach in line with the Pathfinder Framework for the exchange of product carbon footprint data. In the case of EU ETS, product CETs can offer a reference of the embodied emissions of goods sourced outside of the EU, and the total amount of EUAs that importers are required to purchase and surrender under CBAM. By tracking the various organizations involved in a product life cycle, CET can facilitate the trade-balancing rules described above.

⁴ https://www.wto.org/english/tratop_e/envir_e/envt_rules_exceptions_e.htm

In the examples outlined above, different instances of CET can be used to support the discovery of an organization's direct, or a product's indirect, reporting obligations linked to an ETS. While this offers some degree of flexibility, coordination of different CET instances and carbon markets is crucial. Companies subject to an ETS must consent to the use of the CET instance they participate in. Similarly, the market operator must confirm the adequacy of the CET instance. This will likely require guarantees that CETs are minted by approved agents of the market, including independent auditors and verifiers.

Beyond Emissions Trading

Our goal with this paper was to showcase CETs as one of many emerging technologies whose application to regulated cap-and-trade environments could help to drive ETS markets to even higher levels of integrity, accountability, and credibility, increasing their already substantial utility in the fight against climate change. Ultimately, however, we anticipate CET's value proposition will go far beyond ETSs. Currently, our Taskforce is preparing the release of a comprehensive guidance document to enable CET's implementation across a wide array of climate mitigation strategies. With the UN's declaration of climate breakdown, the world needs an "all-of-the-above" approach. Applying the CET framework can enhance the outcomes of carbon taxation models, bolster the integrity of carbon emissions accounting and reporting, support cross-border trade of embodied emissions, thereby integrating markets in different jurisdictions to address carbon leakage, and more.



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