Carbon as the New Currency: Indonesia's Challenges and Strategies in the Carbon Border Adjustment Mechanism (CBAM)

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Summary

This essay analyses the urgency for Indonesia to respond to the European Union's Carbon Border Adjustment Mechanism (CBAM), which increasingly positions carbon emissions as a key determinant of export competitiveness. Although Indonesia has strengthened the legal basis for Carbon Economic Value (Nilai Ekonomi Karbon/NEK) through Presidential Regulation No. 110 of 2025 and has launched a Carbon Exchange, the effectiveness of these measures remains hampered by a credibility gap. This gap focuses on three aspects: excessively low domestic carbon prices; challenges in Measurement, Reporting, and Verification (MRV), especially the need to measure embedded emissions at the product level; and the lack of synchronisation of operational regulations between ministries for International Carbon Transactions under Article 6 of the Paris Agreement. Thus, although Presidential Regulation No. 110 of 2025 has provided the necessary legal framework, the success of economic protection lies in the quality of technical implementation to secure export access to the global market.

Keywords: *Carbon Border Adjustment Mechanism, Compliance and Voluntary Carbon Market, Carbon-heavy Industry, MRV Product-Level, Corresponding Adjustment*

Introduction: Carbon, New Currency of Global Trade

In an increasingly competitive global trade landscape, carbon is no longer merely an environmental issue but has become a new currency that shapes the competitiveness of products and countries. Increased global participation in the last two decades in the implementation of low-emission industrial transitions and the tightening of global climate regulations (World Bank, 2025), as exemplified by the Carbon Border Adjustment Mechanism (CBAM), have transformed the embedded emissions of imported goods into financial liabilities. This shift fundamentally redefines the cost structure of international trade.

As a result, the establishment of the trade regulations, domestic carbon taxes, and other emission reduction measures has become an essential economic defense strategy—directly affecting export market access and product pricing.

Global transition into a low-carbon economy amplifies carbon principles as a new form of currency, shifting the volunteer commitment into a binding international trade policy. The latest manifestation of this shift is the European Union Carbon Border Adjustment Mechanism (EU-CBAM), which will be fully implemented in 2026. CBAM marks a strategic shift in the EU's climate policy by imposing carbon pricing not only on domestic production but also on foreign producers selling goods in the EU market. The mechanism applies to importers of specific goods originating from outside the EU– namely iron and steel, cement, aluminium, fertilisers, electricity, and hydrogen.

For Indonesia, which is heavily dependent on carbon-intensive export sectors such as iron, steel, and aluminium, this mechanism presents

significant economic and regulatory challenges. Although recent studies show that the implementation of CBAM will not significantly affect overall national export volume–given that the EU is not among Indonesia's top export destinations, the mechanism poses new challenges for CBAM-covered industries. These include potential reductions in industrial output, declines in national welfare, and decreases in consumer surplus driven by rising price indices.

This article examines the challenges of CBAM and how both domestic and global carbon markets require national export sectors to align with the evolving global carbon market landscape. This article argues that successfully navigating this new global trade reality depends on accelerating internationally verified product emission measurement standards (MRV), driven by adjustment to domestic carbon unit market pricing and reinforced through strong policy integration across all relevant institutions.

CBAM as a Global Trade Policy and Domestic Market Response

Not Just an Environmental Tax

The Carbon Border Adjustment Mechanisms (CBAM) is a European Union policy designed to impose a fair carbon price on imported goods emissions, including cement, iron, steel, aluminium, hydrogen, electricity, and fertiliser. The main objective is to prevent carbon leakage–a situation where EU companies shift production to countries with looser climate regulations, or EU-produced goods are replaced by more carbon-intensive imports.

CBAM is an integral part of the broader climate strategy under the European Green Deal, which aims to achieve carbon neutrality by 2050 and supports the tightening of the EU Emissions Trading System (EU ETS) domestically. CBAM is currently in its transition phase: since October 2023, importers have been required to report the embedded emissions of covered products without making payments. Financial obligations are scheduled to begin on 1 January 2026 (European Commission, 2025).

CBAM works by requiring EU importers to purchase CBAM certificates, the price of which reflects the emission allowances under the EU ETS. The amount of the obligation is based on the amount of embedded greenhouse gas emissions in imported products from non-EU countries. The price that importers must pay is equivalent to the weekly average carbon price calculation of the European Union Emissions Trading System (ETS) (European Commission, 2024)

However, CBAM provides a vital adjustment mechanism: if non-EU exporters can prove that they have paid a carbon price in their home country for the same emissions–wether through a carbon tax, domestic carbon trading system, or ETS, that amount can be deducted from their CBAM certificate purchase obligation (European Commission, 2024).

This mechanism effectively equalises carbon costs between EU domestic products and imported products, encouraging exporters worldwide to measure their emissions transparently and invest in cleaner production processes.

Indonesia's Position

The main foundation of Indonesia's climate commitment is Presidential Regulation No. 98 of 2021 concerning the Implementation of Carbon Economic Value (Nilai Ekonomi Karbon/NEK). This regulation establishes the legal basis for recognising greenhouse gas emissions as having economic value and forms

the basis for instruments such as carbon trading, carbon tax, and carbon offsets. The goal is to achieve nationally set emission reduction targets, as outlined in the Enhanced Nationally Determined Contribution (ENDC) document. As stated in the 2022 ENDC document, Indonesia has a target of reducing greenhouse gas emissions by 31.8% with domestic resources and 43.20% with international support by 2030.

A crucial step in implementing the NEK is developing a carbon market. This is specifically regulated by the Financial Services Authority Regulation (Peraturan Otoritas Jasa Keuangan/POJK) No. 14 of 2023 concerning Carbon Trading through a Carbon Exchange. This regulation defines carbon units as securities and appoints the OJK as the regulator.

The carbon trading mechanism in Indonesia is divided into two main schemes: emissions trading (cap and trade), which sets a total emissions quota and allows companies that exceed the limit to sell their allowances to others; and carbon offsets, which offset emissions by supporting carbon reduction or absorption projects elsewhere that generate carbon credits. All traded carbon units must be registered in the National Registry System for Climate Change Control (Sistem Registri Nasional Pengendalian Perubahan Iklim/SRN-PPI). Currently, the new carbon trading policy applies to the power generation sector and the forestry sector (PWC, 2024).

By August 2025, the transaction volume of the Indonesian carbon market reached IDR 78.37 billion. This figure has accumulated since its official launch on September 26, 2023. The carbon transaction volume reached 1,604,781 tons of carbon equivalent (CO_2e) with 281 transactions (IDX Channel, 2025).

Credibility Gap

Although Indonesia has successfully established a legal framework for NEK and launched the Carbon Exchange (IDX Carbon) as a domestic compliance market, there is a significant credibility gap that must be addressed immediately to protect export commodities from full CBAM tariffs.

Suboptimal Carbon Prices

PwC's Indonesia 2024 Carbon Market White Paper highlights that the domestic carbon market is not yet fully integrated and liquid, with initial carbon prices (especially in the electricity sector) relatively low compared to emission permit prices under the EU ETS (PwC, 2024). As of September 2024, the market price of carbon credits is IDR 58,800 per ton (approximately USD 3.8). By comparison, the estimated cost of emission reductions from afforestation projects ranges from USD 35 to USD 65 per ton of CO_2 (PwC, 2024).

Although Indonesia has implemented a carbon tax in 2025 for the power generation sector, the proposed base price of IDR 30,000 or approximately USD 2 per ton is considered too low compared to the global average (Kementerian Keuangan, 2025). For context, the global average carbon tax price is around USD 6 per ton, with some regions, such as the European Union, setting carbon prices as high as USD 90 per ton (PwC, 2024). Meanwhile, Singapore, the first Southeast Asian country to implement a carbon tax since 2019, set the rate at USD 25 in 2025 and will increase to USD 45 in 2026 (Kementerian Keuangan, 2025).

The same white paper argues that this low value may not effectively encourage market supply for carbon credits. Therefore, the carbon tax price should ideally be higher than the carbon

credit market price in order to effectively incentivise emission reductions and drive carbon market demand.

Presidential Regulation No. 110 of 2025 provides a stronger legal basis for the NEK instrument, but the weak price signal remains a major obstacle to CBAM tariff adjustment claims.

MRV Quality and SRN-PPI Data Transparency

More crucially, the main challenge lies in the Measurement, Reporting, and Verification (MRV) framework. Presidential Regulation No. 110 of 2025 reaffirms and strengthens the legality of MRV as a fundamental component of NEK implementation. However, the challenge going forward is ensuring the quality of implementation and accountability of technical data in the field. MRV standards and carbon project methodologies in Indonesia are not yet fully aligned with or recognised as equivalent to EU standards at the product level. This is due to the nature of CBAM guidelines.

In terms of measurement, CBAM requires EU importers to report emissions per ton of product (embedded emissions) from the exporter's factory. Indonesia's domestic MRV currently focuses on emissions per company or per project (e.g., forestry projects). Indonesia does not yet have a national scheme that requires and verifies product-level emissions, recognised by the EU (product carbon footprint). EU standards, such as the Product Environmental Footprint (PEF), are very strict.

For reporting and verification, projects with a carbon footprint must register with SRN-PPI to be fully recognised and eligible to claim credits. The registry currently allows carbon unit calculations using methodologies published by directorates-general and national standardisation bodies, as well as methodologies under the United Nations Framework Convention on Climate Change (UNFCCC), to be registered as carbon projects.

As of November 2025, the registry currently recognises a total of 60 methodologies, excluding those under the UNFCCC (SRN-PPI,2025). These methodologies are also classified based on the NDC sector in Indonesia.

However, the information disclosed to the public in the SRN-PPI is still limited: title, objectives, administrative information, project type and sector, and verified emission reductions (SRN PPI, 2025). The lack of documents disclosed to the public significantly hinders transparency and reduces confidence among broader stakeholders, including EU regulators (PwC, 2024).

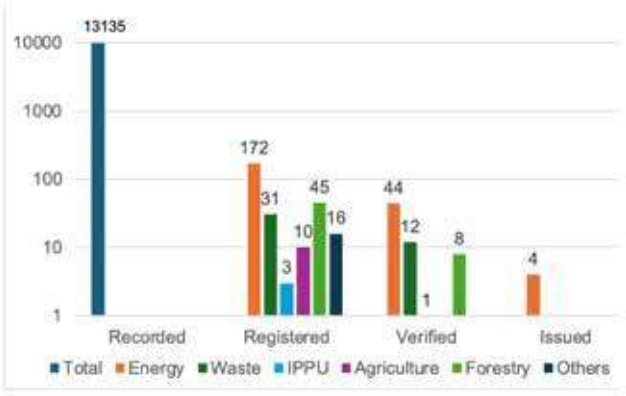

Figure 1. Number of Registered Projects under SRN-PPI by Sector (as of June 2024).
Source: PwC (2024)

Furthermore, there is a need for Mandatory Third-Party Verification. The registry system must incorporate a rigorous verification process with third parties, such as independent auditors or verifiers, to maintain credit integrity. Ideally, verifiers should be internationally accredited. The alignment of Indonesian MRV standards with international standards provides assurance to importers (affected by CBAM) that the carbon credits generated are valid and contribute to real emissions measurements (PwC, 2024).

International Recognition Mechanism under Article 6 of the Paris Agreement

This credibility gap is also contributed to by the Voluntary Carbon Market (VCM) in Indonesia. To attract global buyers, Indonesian carbon credits must demonstrate high integrity and meet internationally recognised standards.

The government has taken an important step by signing a Mutual Recognition Agreement (MRA), an agreement between two or more countries to mutually recognise carbon credits generated from projects in one of the partner countries (Antara, 2025).

The agreed MRA is aligned with global certification standards (such as the Gold Standard), allowing domestic projects to be verified with more accepted standards. The issuance of Presidential Regulation No. 110 of 2025 also clarifies regulations related to these international carbon transactions.

Regulations related to international carbon transactions include:

- Authorisation of international carbon transactions. The obligation of approval by the Minister of Environment and Forestry to the NEK (carbon economic value) responsible party before carbon units can be transferred abroad.
- Corresponding adjustment (CA): the obligation to adjust the accounting of carbon units in Indonesia's Nationally Determined Contribution (NDC) target. This is an effort to synchronise Indonesian regulations with Article 6 of the Paris Agreement so that credits sold abroad (for example, to Japan or Korea) can be legitimately counted toward the country's NDC targets without resulting in double-counting.

Government recognition of international carbon units and the alignment of the national framework (authorisation and CA arrangements) with Article 6 of the Paris Agreement are very important. This is a fundamental step to avoid double-counting, which is a requirement for the EU to recognise domestic carbon prices (both from the ETS and VCM) as the basis for CBAM tariff adjustments.

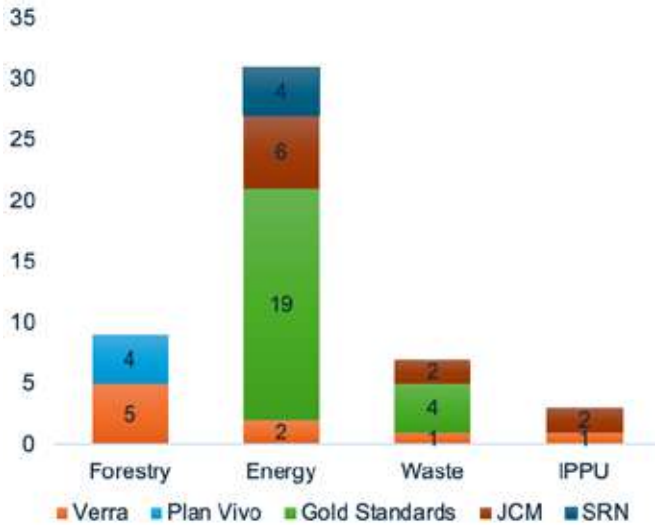

Figure 1. Comparison of Registered Carbon Projects in International and National Registries (as of June 2024)
Source: PwC (2024)

However, MRA only addresses administrative interoperability and does not reflect the integrity assurance required for deduction under CBAM tariff adjustment mechanisms. This is because CBAM demands strict proof that the carbon price has been 'effectively paid' in the third country (European Commission, 2024).

An MRA is merely a governmental legal agreement; it does not serve as documentary proof of the financial transaction. To bridge this financial and verification gap, ensuring that Indonesian carbon projects meet broader criteria such as the Core Carbon Principle (CCP) is necessary.

While CCP is not a payment receipt, it functions as a superior layer of integrity assurance (Perspectives Climate Group, 2024). The CCP Assessment Framework provides a high-quality global baseline, systematically assessing carbon-heavy projects based on 10 fundamental principles (ICVCM,2023).

Competitiveness Threats: Rising Costs and Sectoral Focus

The threat of full CBAM tariff payments at the EU border translates the risk of MRV recognition failure into a direct cost impact that decreases export margins. Although macroeconomically, the impact of CBAM on Indonesia's GDP and total trade appears limited, a hybrid Computable General Equilibrium (CGE) simulation study by the Centre for Strategic and International Studies (CSIS) in 2024 reveals that CBAM implementation still incurs specific costs (Fauri et al., 2024).

The simulation shows that tariff increases on certain carbon-intensive products, such as iron and steel, cement, and fertilisers, cause a 0.1% decline in Indonesia's total exports and only a minor impact of 0.0002% on national GDP. However, these losses are centred on welfare losses (around USD 36 million), which mainly stem from a decline in production in sectors subject to CBAM tariffs, such as chemicals (-0.38%), ferrous metals (- 0.096%), and mineral products (-0.02%). The iron and steel sector, along with aluminium, is a critical case study that is highly vulnerable (Fauri et al., 2024).

The impact of CBAM costs also has widespread indirect implications. Simulations show that sectors such as Food Crops and Processed Foods also experience a decline in production. This occurs because these products are affected by the imposition of additional CBAM tariffs on the fertiliser sector, which is an important input for agriculture, effectively increasing food production costs (Fauri et al., 2024).

Although the decline in production is not substantial, this correlation shows the potential for CBAM to increase food insecurity and demonstrates that climate policy also has supply chain impacts that go beyond the industries directly targeted.

Ultimately, the threat of CBAM costs and potential loss of market access is driving a mandatory transformation within the Indonesian industry. This policy effectively forces the industry to view decarbonization not simply as compliance with domestic environmental regulations, but as a necessary investment to maintain access to the premium European Union market. Furthermore, companies must invest in the implementation of internationally credible measurement and reporting to demonstrate low emissions and claim tariff adjustments.

Urgent Policy Direction

Although Indonesia faces challenges in terms of MRV credibility and market liquidity, the success in establishing a legal framework and domestic carbon market infrastructure is an important milestone.

The issuance of POJK No. 14 of 2023 and the granting of permission to PT Bursa Efek Indonesia to organise a Carbon Exchange are concrete demonstrations of capital market governance. In addition, the initiative to expand the MRA with global standards such as the Gold Standard and the legal umbrella of Presidential Regulation No. 110 of 2025 for potential cross-border carbon trading demonstrates Indonesia's commitment to building a globally recognised foundation for its carbon credits.

Although the foundation is solid, the challenge

for CBAM lies in ensuring product technical compliance. To bridge this gap, three strategic steps are needed.

First, strengthen MRV for CBAM Compliance: Accelerate the adoption of internationally verified and accredited product-level emission measurement standards. Globally, investors' main concern in carbon projects is the lack of accountability and effectiveness, which seriously undermines market confidence. In Indonesia, this challenge is particularly prominent because the technical documentation and MRV processes for projects are still in their infancy.

Therefore, a crucial step is to improve the domestic MRV system and strengthen data transparency to build investor confidence. The methodology for carbon projects in Indonesia must be aligned with internationally accepted standards in order to attract the global market.

In addition, the SRN-PPI needs to improve transparency by aligning with the information disclosure standards applied by international registries. Currently, the SRN-PPI only provides limited access to general information, which is far less than international registries that display complete project details—including Project Design Documents (PDDs), Monitoring Reports, and Feasibility Studies (PwC, 2024).

This lack of transparency can hinder stakeholders from fully understanding the scope, implementation strategy, and impact of projects. These efforts will strengthen stakeholder confidence, attract global investors, and support the long-term sustainability of the carbon market (PwC, 2024).

Second, review the current carbon tax base price and related sectoral thresholds. The current stagnation of the carbon market is partly due to low domestic demand for carbon credits and the lack of clarity on the applicable market mechanisms. To overcome this, the government needs to actively provide additional incentives to strengthen market growth.

First, expand the accelerated implementation of the cap-and-trade system to other carbon-intensive sectors. Currently, this scheme is still limited to coal-fired power plants and forestry. Second, a well-designed carbon tax can be a strong driver for the growth of carbon credit demand. However, the carbon base price in Indonesia still needs to be adjusted to be in line with international standards. Ideally, the carbon tax rate should be set higher than the market price of carbon credits, so that companies are encouraged to buy cheaper carbon credits while investing in emission reduction efforts (PwC, 2024).

Third, strict synchronisation of OJK/KLHK regulations on NEK with the export and industry strategies of the Ministry of Industry and the Ministry of Trade, avoiding overlapping that burdens business actors. The carbon regulatory framework in Indonesia is still growing. Under Presidential Regulation No. 110 of 2025, this is an upgraded legal foundation for the carbon trading mechanism and currently covers international carbon transactions. However, the challenge now lies in the need for detailed technical guidelines and operational synchronisation between regulators.

Clear inter-ministerial coordination and the establishment of uniform technical guidelines for the implementation of Presidential Regulation 110/2025 are crucial to attract investment and strengthen the domestic carbon market. By opening access to global demand through a clear framework, carbon prices can increase, and emission reduction projects become more economically attractive.

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