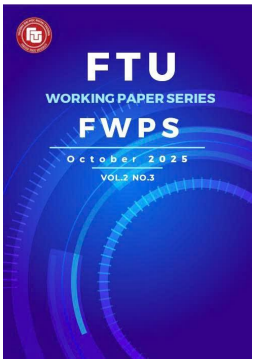

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XUẤT KHẨU THÉP VIỆT NAM SANG THỊ TRƯỜNG CHÂU ÂU DƯỚI CƠ CHẾ ĐIỀU CHỈNH BIÊN GIỚI CARBON (CBAM): CƠ HỘI VÀ THÁCH THỨC

Phan Ngọc Linh[1], Nguyễn Phương Huyền, Đỗ Khánh Linh, Nguyễn Thu Trang
Sinh viên K62 CLC Kinh tế Đối ngoại – Viện Kinh tế và Kinh doanh Quốc tế
Trường Đại học Ngoại Thương, Hà Nội, Việt Nam

Nguyễn Hoàng Phương Linh
Sinh viên K61 CLC Kinh tế Đối ngoại – Viện Kinh tế và Kinh doanh Quốc tế
Trường Đại học Ngoại Thương, Hà Nội, Việt Nam

Vũ Huyền Phương
Giảng viên Viện Kinh tế và Kinh doanh Quốc tế
Trường Đại học Ngoại Thương, Hà Nội, Việt Nam

Tóm tắt

Cơ chế điều chỉnh biên giới carbon (CBAM) do Liên minh châu Âu (EU) đưa ra là một hình thức rào cản phi thuế mới, nhằm ngăn chặn hiện tượng rò rỉ carbon và thúc đẩy trách nhiệm khí hậu toàn cầu. Trong bối cảnh Việt Nam đang nỗ lực hội nhập sâu hơn vào chuỗi cung ứng toàn cầu, ngành thép của nước ta đang đối mặt với cả những thách thức lẫn cơ hội từ CBAM. Nghiên cứu này phân tích tác động tiềm tàng của CBAM đối với xuất khẩu thép của Việt Nam sang EU thông qua việc xem xét đặc điểm phát thải, số liệu thương mại và các yêu cầu tuân thủ. Bài viết làm rõ tính hai mặt của CBAM: một mặt là rào cản do chi phí tuân thủ tăng cao và nguy cơ giảm sức cạnh tranh; mặt khác là cơ hội thu hút đầu tư xanh và nâng cấp công nghệ sản xuất. Nghiên cứu cũng đánh giá chiến lược ứng phó ở cấp độ doanh nghiệp và chính sách, chỉ ra những

[1] Tác giả liên hệ, Email: k62.2312150135@ftu.edu.vn

khoảng trống về nhận thức, hướng dẫn kỹ thuật và hỗ trợ tài chính. Cuối cùng, bài viết đề xuất các giải pháp thực tiễn nhằm giúp doanh nghiệp và nhà hoạch định chính sách Việt Nam thích ứng hiệu quả, biến CBAM thành động lực thúc đẩy sản xuất bền vững.

Từ khóa: CBAM, xuất khẩu thép, EU, carbon, Việt Nam

VIETNAM'S STEEL EXPORTS TO THE EU UNDER THE CARBON BORDER ADJUSTMENT MECHANISM (CBAM): OPPORTUNITIES AND CHALLENGES

Abstract

The Carbon Border Adjustment Mechanism (CBAM), introduced by the European Union, represents a new form of non-tariff barrier aimed at preventing carbon leakage and promoting global climate responsibility. As Vietnam seeks deeper integration into global supply chains, its steel industry is facing both new challenges and opportunities under CBAM. This paper analyzes the potential impacts of CBAM on Vietnam's steel exports to the EU by examining emission characteristics, trade data, and compliance requirements. The study highlights the dual nature of CBAM as both a constraint, due to rising compliance costs and competitiveness risks, and an opportunity for Vietnam to attract green investments and upgrade its production technologies. The research also evaluates the response strategies at the enterprise and policy levels, identifying gaps in awareness, technical guidance, and financial support. The paper concludes with practical recommendations to help Vietnamese steel firms and policymakers adapt effectively and turn CBAM into a driver of sustainable transformation.

Keywords: CBAM, steel exports, EU, carbon, Vietnam

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1. Introduction

In recent years, global supply chains have undergone significant shifts due to rising geopolitical tensions, particularly the U.S.-China trade war. This restructuring has opened up new opportunities for emerging markets, with Vietnam quickly rising as a key manufacturing destination. Backed by trade agreements such as the EVFTA and CPTPP, a stable political environment, competitive production costs, and improving infrastructure, Vietnam has become an appealing alternative to China for global manufacturers. Within this context, the country's steel industry has experienced notable growth, contributing strongly to both domestic development and export performance.

However, Vietnam's steel sector now faces a critical challenge in maintaining access to high-standard markets like the European Union (EU). The introduction of the EU's Carbon

Border Adjustment Mechanism (CBAM) - which applies a carbon cost on imported products such as steel with high embedded emissions - poses a significant hurdle. While CBAM aims to reduce global carbon leakage and support EU climate goals, it creates new compliance pressures for Vietnamese exporters. Adapting to these rules will require the industry to modernize production and improve carbon transparency to remain competitive in EU markets.

This research adopts a mixed-methods approach, combining qualitative analysis of policy frameworks and academic literature with quantitative review of trade and emissions data. Sources include Eurostat, UN Comtrade, the Vietnam Steel Association (VSA), and corporate sustainability reports. By integrating these materials, the study offers a comprehensive analysis of how CBAM affects Vietnam's steel industry. It evaluates both business-level and policy-level challenges, reviews Vietnam's current level of preparedness, and identifies strategies to help the sector align with EU expectations while strengthening its role in global value chains.

2. Literature Review

2.1. Previous Studies

The EU's Carbon Border Adjustment Mechanism (CBAM) is expected to significantly affect trade in carbon-intensive sectors, particularly steel, posing both risks and opportunities for Vietnam as a key exporter to the EU. Macroeconomic studies employing computable general equilibrium (CGE) and partial equilibrium (PE) models indicate that while the overall impact of CBAM on Vietnam's economy may be limited, carbon-intensive industries such as steel, aluminium, and cement could face reduced output. Although Vietnam's steel sector benefits from lower direct emissions due to its reliance on Electric Arc Furnace (EAF) technology, its high indirect emissions—stemming from a fossil-fuel-heavy electricity grid—remain a concern (ERCST, 2021).

Sector-specific analysis remains relatively scarce. However, Tran and Do (2024) find that CBAM, when implemented in isolation, provides limited incentive for decarbonization. Complementary measures, such as domestic carbon pricing, may be necessary to drive cleaner production practices. Moreover, the lack of an operational emissions trading system (ETS) in Vietnam reflects institutional challenges that hinder full CBAM compliance.

Comparative studies from countries like China and Korea offer additional insights. A GTAP-E model simulation suggests China's steel exports to the EU could decline by as much as 32% under CBAM (Zhu et al., 2024), while Korean research emphasizes the sensitivity of steel exports to price changes and underscores the strategic need for green technology adoption (Kang & Lee, 2023).

From a policy perspective, Brandi (2021) argues for a fairer CBAM design for developing countries, recommending mechanisms such as exemptions for Least Developed Countries

(LDCs), revenue recycling, and targeted capacity-building. However, Vietnam-specific policy frameworks and support mechanisms remain underdeveloped and warrant further research.

2.2. Existing research gaps

Despite the growing interest in CBAM, several notable gaps remain, particularly with regard to Vietnam's steel sector:

- Lack of sector-specific focus: Most studies do not explore the unique structure and decarbonization potential of Vietnam's steel industry.
- Limited micro-level insights: There is a shortage of firm-level research on how steel exporters are responding to CBAM.
- Institutional readiness under-analyzed: Vietnam's ETS planning and policy alignment are rarely examined.
- Opportunities underexplored: Literature focuses on challenges but neglects CBAM's potential as a driver of green transformation.
- Outdated models: Some simulations rely on pre-2020 assumptions, ignoring recent market and policy shifts.

2.3. Theoretical Framework

2.3.1. Non-Tariff Measures (NTMs)

The World Trade Organization (WTO) defines Non-Tariff Measures (NTMs) as *"the policy measures other than the ordinary customs tariffs that can potentially have an economic effect on international trade in goods, changing quantities traded, or prices or both"*. The effect on trade here can be both positive and negative. While NTMs can serve legitimate goals such as health, environmental, or domestic protection, they may unintentionally act as barriers to trade if they are more restrictive than necessary, lack transparency, and discriminate against certain countries. In this sense, NTMs may turn into Non-Tariff Barriers (NTBs) (WTO, 2022).

2.3.2. Carbon pricing

Carbon pricing is a mechanism that reduces greenhouse gas emissions (GHG) by applying a cost on emissions and/or providing incentives to reduce them. Carbon pricing works by placing a cost on GHG, which reflects the external damages caused by climate change. This effectively changes the responsibility of paying for the damages of climate change from the public to the GHG emission producers. Therefore, the producers need to reduce their emissions to avoid paying a higher price; otherwise, they will have to pay a higher price to continue emitting (UNFCCC, n.d).

There are currently two main types of carbon pricing instruments:

- Emissions Trading System (ETS): Also known as "cap and trade," this sets a cap on total greenhouse gas (GHG) emissions and allows entities to buy and sell emission allowances. The carbon price fluctuates based on market supply and demand for allowances.

- Carbon tax: This imposes a fixed price on carbon emissions, typically through a tax on fossil fuels. Unlike ETS, it provides price certainty but does not guarantee a specific reduction in emissions.

2.3.3. Carbon leakage

Carbon leakage is the problem when companies relocate production from countries with strict climate policies to countries with more lenient regulations. This shift allows companies to avoid the costs associated with strict environmental standards. Therefore, while emissions may decrease in the countries of origin, global GHG emissions may increase at a higher rate in other countries.

2.3.4. Carbon credits and trading

Carbon credits work like permits, giving businesses the right to release a limited amount of GHG. Each credit typically represents one ton of carbon dioxide or its equivalent in other gases. These credits - sometimes called carbon allowances - are part of a broader system designed to help lower global emissions over time. Meanwhile, carbon trading is the buying and selling of credits that permit a company or other entity to emit a certain amount of carbon dioxide or other greenhouse gases.

Vietnamese enterprises, especially in high-emission sectors like steel, cement, and energy, can benefit greatly from engaging in the carbon credit market. When companies lower their emissions, they not only save money by staying within regulatory limits but can also earn extra income by selling any unused carbon credits to others. Participation also enhances brand credibility and facilitates access to strict markets like the EU under CBAM. As Vietnam prepares to launch its carbon credit exchange by 2025, proactive businesses investing in green technologies will gain financial advantages, export opportunities, and a stronger position in global sustainable supply chains (VIET RESEARCH, 2025).

3. Overview of CBAM

3.1. Introduction of CBAM

In 2019, intending to become the first climate-neutral continent, the European Commission published The European Green Deal - a set of proposals to reduce net greenhouse gas emissions by 55% before 2030. In 2021, CBAM was proposed as a part of the “Fit for 55” legislative package. To address the risk of carbon leakage, in 2023, CBAM was officially established. CBAM is the EU’s policy tool to put a fair price on the carbon emitted during the production of carbon-intensive goods imported into the EU and encourage a cleaner industrial production (European Commission,2023).

3.2. Roles and objectives

One of the main purposes of constructing the CBAM is to minimize the risk of carbon leakage. This activity can cause a danger of rising carbon emissions, which lead to global warming. As stated in the European Parliament (2022), the Paris Agreement set a goal to reduce the increase of average temperature to 1.5°C above the pre-industrial level, which aimed to tackle modern-day environmental problems and crises.

Another rationale for developing the CBAM is creating and ensuring a fair competition between products manufactured in the EU under the EU ETS and foreign imports (European Commission, 2023). Under the EU ETS, EU domestic companies are required to report, submit data about carbon emissions during the production process and surrender enough allowances for their annual emissions. To level the playing field between domestic industries and foreign manufacturers, imports face similar carbon costs compared to EU businesses.

Crucially, encouraging global decarbonization is also the objective of the CBAM under Regulation (EU) 2023/956 (European Commission, 2023). If foreign countries want to export carbon-intensive goods to the EU without additional carbon costs, they must adopt similar climate policies. This implies that other countries also must implement their own carbon pricing mechanisms, making efforts to reach global climate ambitions aligned with the Paris Agreement. (European Parliament, 2022)

3.3. Sectors and scopes

The CBAM of the EU will cover during the transitional period products such as: iron/steel, cement, fertilizers, aluminum, hydrogen, and electricity. The particular products within these categories bear high carbon leakage risks and account for 94% of the European Union's emissions.

The scope of CBAM covers both direct emissions and indirect emissions. Direct emissions are emissions directly related to the production process of targeted commodities. These include CO_2 emissions from burning fossil fuels or chemical reactions, which will be reported in the transitional phase (2023-2025) and the definitive regime in 2026. Indirect emissions are emissions from electricity, heat, and steam during the production process. In the future, indirect emissions will be included, particularly for high electricity use sectors. (European Commission, 2023)

3.4. Mechanisms overview

Basically, CBAM applies a carbon tax to all goods imported into the EU market, calculated based on the share of GHG emissions during production in the exporting country. Under this mechanism, importers must register with the national authority and purchase CBAM certificates priced under the European Union Emissions Trading System (EU ETS). When

importing goods into the EU, businesses must report the emissions generated by the product and the corresponding number of carbon credits for the year. If it can be demonstrated that the carbon cost has been paid in the country of origin, the importer can claim a deduction for these emissions under CBAM regulations.

3.5. Implementation process

3.5.1. Transitional phase: October 1, 2023 - December 31, 2025

During this phase, CBAM focuses only on data collection, with no requirements for importers to pay for the carbon emissions. Instead, they are required to submit quarterly reports, including the quantity of imported goods, the CO2 emissions of chemical goods, and any carbon prices or taxes that may be calculated in the country of origin. This phase is intended to help businesses get used to the new regime while also allowing the EU to build a reliable emission database. Although there are currently no certificate purchases involved yet, penalties can also be imposed if companies fail to comply with the reporting obligations.

3.5.2. Definitive phase: From January 1, 2026

In this phase, full financial obligations for importers of carbon-intensive goods to the EU are required. Importers will have to purchase CBAM certificates that reflect the GHG emissions embedded in the production of those goods in the country of origin. Each year, by 31 May, importers must submit an annual CBAM declaration. This includes the volume of goods imported during the previous calendar year, the corresponding embedded emissions, the carbon price paid in the country of origin, and the number of CBAM certificates purchased. If importers do not have sufficient certificates to match their declared emissions, financial penalties may apply. To implement this, EU member states are required to establish competent authorities to manage CBAM and ensure cooperation with national customs authorities.

This phase also represents a significant shift in the EU's climate strategy, ensuring that imported goods bear the same carbon cost as goods produced in the EU. Previously, under the EU ETS, many industries in the EU received a free portion of their carbon emissions allowance, known as a free allowance, to prevent carbon leakage. However, with CBAM coming into effect, free emissions allowances will be reduced initially at a slower rate, which will increase as the period comes to an end. And by 2034, CBAM will completely replace them.

4. Vietnam's Steel Industry and EU Trade Exposure

4.1. Emission Characteristics of Vietnam's Steel Industry

4.1.1. Industry Size and Structure

Vietnam's steel industry has grown rapidly, reaching 19 million tons of crude steel output in 2024 and ranking 11th globally (Steel Radar, 2025). According to the VSA, crude steel output

in the first quarter of 2025 alone reached 5.8 million tons, up 9.1% compared to the same period in 2024. In line with this increase, finished steel production also recorded positive growth:

	Tháng 3/2025		Quý I/2025	
	Sản lượng (tấn)	So với cùng kỳ năm ngoái	Sản lượng (tấn)	So với cùng kỳ năm ngoái
Thép xây dựng	1.118.874	▲ 29%	3.002.731	▲ 11,0%
Thép cán nóng (HRC)	622.939	▲ 5%	1.842.369	▼ 1,3%
Thép cán nguội (CRC)	255.643	▲ 11%	691.274	▲ 13,0%
Tôn mạ	492.498	▲ 2%	1.349.164	▲ 1,5%
Ống thép	208.051	▲ 18%	579.162	▲ 7,0%
Tổng cộng	2.698.005	▲ 15%	7.464.700	▲ 6,0%

Figure 1: *Finished steel production in March and cumulative output in the first quarter of 2025*
Source: *Vietnam Steel Association (2025)*

The industry is highly concentrated, with major players dominating. Hoa Phat Group (HPG) leads in profits (88%) and market share, approximately 39% in construction steel and nearly 33% in steel pipes. HPG's integrated complexes using EAF technology form the backbone of the industry's green transition (Hoa Phat Group, 2025). Other key firms like Hoa Sen Group and Ton Dong A focus on coated steel, exporting to the EU and US, thanks to advanced technology and quality certifications.

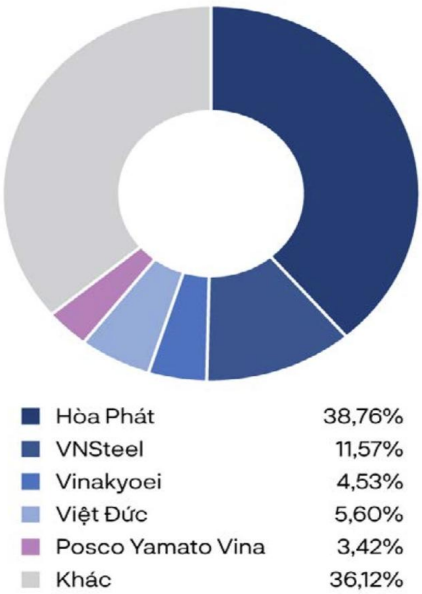

Figure 2: *Top 5 market share of construction steel consumption in Q1/2025 (Unit: Tons)*
Source: *Vietnam Steel Association (2025)*

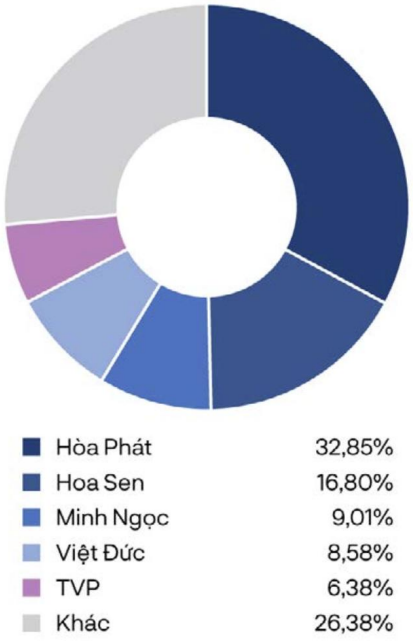

Figure 3: *Top 5 market share of steel pipe consumption in Q1/2025 (Unit: Tons)*
Source: *Vietnam Steel Association (2025)*

However, the sector remains dual-structured. Many SMEs rely on outdated tech and lack emissions monitoring, hindering CBAM compliance and posing risks under stricter climate regulations. In short, despite strong growth among top firms, the industry faces challenges from uneven technological and environmental preparedness.

4.1.2. Emission profile

Vietnam's steel industry has a diverse emission profile, primarily influenced by the production technologies employed. In 2022, production was estimated at 20 million tonnes of finished steel. In 2022, the majority of domestic steel was produced using the basic oxygen furnace (BOF) process (about 65%), while the remainder was produced using the electric arc furnace (EAF) and induction furnace (IF) processes (about 35%). Globally, BOF plants account for two-thirds of capacity. Currently, up to 90% of planned capacity in Asia is being developed under BOF projects due to its cost advantages at scale.

According to a study by the World Steel Association (2024), the BF–BOF method, which relies heavily on iron ore and coke, emits about 2.32 tonnes of CO_2 per tonne of crude steel. In contrast, EAF routes, which mainly use recycled steel scrap and electricity, emit about 0.66 to 0.7 tonnes of CO_2 per tonne.

	CO_2 emissions intensity by production route			Energy intensity by production route		
	tonnes CO_2 per tonne of crude steel cast			GJ per tonne of crude steel cast		
	2021	2022	2023	2021	2022	2023
Global average	**1.91**	**1.92**	**1.92**	**21.04**	**21.01**	**21.27**
BF-BOF	**2.33**	**2.33**	**2.32**	**24.13**	**23.98**	**24.20**
Scrap-EAF	**0.66**	**0.67**	**0.70**	**10.00**	**10.13**	**10.24**
DRI-EAF*	**1.40**	**1.36**	**1.43**	**22.58**	**22.25**	**23.13**

**Data concerning global crude steel production using DRI is not currently collected. The denominator in this calculation is therefore calculated by the worldsteel data management team based on information contained in worldsteel's collective databases.*

Figure 4: *CO2 emissions and energy intensity, 2021-2023*
Source: *World Steel Association (2024)*

Although EAF technology is more environmentally friendly, its advantage in Vietnam is reduced due to the national grid's heavy reliance on fossil fuels, especially coal. Emissions from EAF in Vietnam average 0.62 tons of CO_2 per ton of steel, still lower than the global average, while BF–BOF emits around 2.35 tons per ton (Chu, Nguyen & Le, 2023).

However, many SMEs in Vietnam's steel industry lack an internationally standardized emissions inventory and reporting system, making it difficult to meet transparency requirements. This absence of accurate emissions data limits their access to markets with strict climate rules, especially under the EU's CBAM.

4.2. Vietnam - EU Steel Export Overview

Vietnam's steel exports to the EU grew strongly after the EVFTA took effect in August 2020. In 2023, exports reached 2.55 million tons, nearly double the 1.3 million tons in 2022, making the EU Vietnam's second-largest steel export market with 23% of total exports (WTO Center, 2024).

By May 2024, the EU surpassed ASEAN to become Vietnam's top export destination, accounting for 26% of steel export turnover. Vietnam's market share in the EU rose sharply from 0.7% in 2020 to 6.1%, ranking 7th among EU steel suppliers (Pham, 2024).

However, in 2025, Vietnam's steel exports showed a general downward trend:

	Tháng 3/2025		Quý I/2025	
	Xuất khẩu (tấn)	So với cùng kỳ năm ngoái	Xuất khẩu (tấn)	So với cùng kỳ năm ngoái
Thép xây dựng	148.835	▼ 23%	452.151	▼ 10%
Thép cán nóng (HRC)	68.258	▼ 56%	198.318	▼ 74%
Thép cán nguội (CRC)	78.433	▲ 67%	204.660	▲ 72%
Tôn mạ	145.188	▼ 48%	471.853	▼ 41%
Ống thép	32.035	▲ 11%	87.493	▲ 17%
Tổng cộng	472.749	▼ 33%	1.414.475	▼ 37%

Figure 5: *Finished steel exports in March and cumulative in Q1/2025*
Source: *Vietnam Steel Association (2025)*

Exports to the EU also dropped, following the same downward trend. The European Commission proposed provisional anti-dumping duties of up to 12.1% on Vietnam's hot-rolled steel, threatening the competitiveness of firms, especially since this product brought in US$370 million in 2024, nearly 10% of total steel export revenue (Vietnam Investment Review, 2025).

Additionally, the CBAM transition period starting in October 2023 introduced stricter carbon disclosure rules. Although fees begin in 2026, the current reporting requirements already pose technical challenges for firms lacking emission monitoring systems, potentially prompting EU buyers to switch to cleaner suppliers.

5. Impacts of CBAM on Vietnam's Steel Industry

5.1. Opportunities

5.1.1. Supply chain shift in steel imports from China to Vietnam under CBAM pressure

The Carbon Border Adjustment Mechanism (CBAM) is being implemented amid shifting global supply chains, partly driven by the U.S.-China trade tensions and increasing decarbonization pressures. Since 2018, U.S. tariffs on Chinese steel (25%) and environmental concerns have prompted major markets such as the EU to reduce reliance on China, which produces steel mainly via carbon-intensive blast furnace (BOF) routes.

Vietnam stands to benefit from this shift. With an increasing share of electric arc furnace (EAF) technology, cost advantages, and favorable trade agreements (e.g., EVFTA, CPTPP), Vietnam is becoming a competitive alternative for steel imports. Leading firms like Hoa Phat, Hoa Sen, and Ton Dong A are investing in green production technologies and emissions tracking systems (e.g., ISO standards, GHG Protocol), aligning well with CBAM requirements. This positions Vietnam as a viable supplier to climate-conscious markets like the EU.

Additionally, growing FDI inflows to Southeast Asia, particularly in low-emission sectors, highlight Vietnam's attractiveness due to its political stability, carbon neutrality pledge (by 2050), and improving environmental governance.

5.1.2. CBAM creates an opportunity for Vietnam to attract foreign direct investment (FDI) to the green steel sector

The CBAM reinforces Vietnam's urgency to decarbonize its steel industry. As of May 2024, the EU became Vietnam's largest steel export market (26% share), placing strategic pressure on firms to meet the EU's climate-aligned trade requirements (Pham, 2024).

Vietnam's climate commitments, including its net-zero 2050 pledge at COP26 and the upcoming pilot carbon pricing mechanism (launching June 2025), signal a strong policy alignment with CBAM. Under Decision 232 (2020), the ETS framework will require verified emissions reporting for steel and other key sectors.

Vietnam's green transition roadmap further supports its decarbonization efforts. From 2021 - 2025, firms aim to cut emissions by 10–30% through process optimization and energy efficiency. Between 2025 - 2030, the plan includes increasing hydrogen (H_2) use in sponge iron production by 30% (VCCI, n.d.).

These long-term policy signals and green infrastructure efforts enhance Vietnam's credibility and attractiveness for green FDI in steel, especially from partners seeking CBAM-compliant supply chains.

5.2. Challenges

5.2.1. High compliance costs under CBAM

CBAM imposes significant financial pressure on Vietnam's steel industry. In the absence of a domestic carbon pricing system, exporters must fully pay the difference between the EU's carbon price and Vietnam's, through CBAM certificates.

Vietnam's average emission intensity is 2.51 tonnes of CO_2 per tonne of steel—much higher than the global average of 1.85—exposing producers to higher CBAM costs (VNSTEEL, 2023). Compliance also requires costly investments in monitoring, reporting, and verification (MRV) systems, third-party audits, and skilled personnel, which are especially burdensome for SMEs.

These costs will rise further as the EU phases out free allowances under its Emissions Trading System (ETS) from 2026. Without upgrades in technology and emission transparency, Vietnamese steel exporters risk reduced competitiveness and shrinking EU market share. Addressing this challenge will require policy readiness, financial support, and strong public-private collaboration.

5.2.2. Risk of Losing Competitive Advantage Due to Delayed Carbon Accounting and Certification

With CBAM fees starting in 2026, Vietnamese steel firms face serious risks if they lack internationally recognized carbon accounting systems. Despite advantages like lower costs and higher use of electric arc furnaces, exports could still face high CBAM taxes without transparent emissions data (The Economist Intelligence Unit, 2023).

Exporters must report CO_2 emissions and buy EU carbon certificates, priced at €100/ton in early 2023 (The Economist Intelligence Unit, 2023). Without proof of low emissions, firms could face carbon costs of €75–€100/ton (The Conference Board, 2023), eroding profit margins and reducing competitiveness, especially against higher-emission rivals like China. Delays in adopting global standards (e.g., ISO 14064 or GHG Protocol) may hurt not only access to the EU market but also others moving toward carbon pricing.

6. Responses to CBAM: Enterprise & Policy Level

6.1. Micro-Level: Enterprise Responses

6.1.1. General Awareness Toward CBAM

Despite CBAM's approaching enforcement, awareness among Vietnamese enterprises remains low. As of 2023, over 60% had heard of CBAM, but only 4% took action, and 36% believed it was irrelevant to them (WTO Center, 2024). By late 2024, this situation persisted. During a September 2024 seminar, industry representatives confirmed that most firms still lacked a clear understanding. According to Nguyen Hong Loan, a CBAM Assessment Project expert, very few directly impacted firms were preparing adequately, citing scattered and inconsistent information as key barriers. Although several training initiatives have been launched, they remain fragmented and lack standardized, validated content, limiting their impact (WTO Center, 2024).

6.1.2. Adaptive Efforts: Specific Actions by Enterprises

In response to CBAM, initial adaptation efforts have emerged within Vietnam's steel sector. The Vietnam Steel Association (VSA) has actively supported members, particularly SMEs, by disseminating policy updates, conducting training on GHG inventory methods, and collaborating with partners like the International Finance Corporation (Vietnam Steel Corporation, 2023). VSA is also finalizing a decarbonization roadmap targeting carbon neutrality by 2050, aligning with both national strategies and EU regulations (WTO Center, 2024).

Hoa Phat Group, Vietnam's largest steel exporter to the EU, has taken concrete steps since 2023. These include reusing surplus coal gas for power generation, applying closed-loop technologies from G7 countries, and adopting energy-saving solutions to lower CO_2 intensity. In January 2025, Hoa Phat received ISO 14064-1:2018 certification from BSI, demonstrating

verified GHG measurement and reporting practices - a prerequisite for CBAM compliance (HPG Group, 2025). These efforts aim to cut emissions, reduce costs, and enhance competitiveness in the EU market under CBAM enforcement in 2026 (Công Thương, 2023).

6.2. Macro-Level: Policy Responses

6.2.1. Current Framework

Vietnam has adopted a series of strategic policies to adapt to the EU's Carbon Border Adjustment Mechanism (CBAM) and accelerate the transition to a low-carbon economy, especially in the steel industry, one of the sectors most directly affected by the new regulations.

a. Net-Zero 2050 Commitment and Updated Nationally Determined Contribution (NDC) in 2022:

At the COP26 Summit, Viet Nam committed to achieving net-zero emissions by 2050. To achieve this goal, the country updated its NDC in 2022, increasing its unconditional GHG emission reduction target from 9% to 15.8% and its conditional target (with international support) from 27% to 43.5%, compared to the Business as Usual (BAU) scenario in 2030. These targets cover sectors such as energy, industry, agriculture, land use, and waste, forming the legal basis for emissions reduction in the steel sector.

b. Development of Green Steel Industrial Clusters:

Vietnam is actively promoting the development of green steel industrial clusters to reduce emissions and comply with international environmental standards. In Thua Thien Hue province, the Chan May Green Steel Plant - a project seeking an investment of about US$1.3 billion - is expected to produce about 3 million tonnes of hot-rolled steel and high-quality engineering steel annually. Meanwhile, the Phu My 3 Industrial Zone in Ba Ria - Vung Tau is being developed as a green industrial park model, focusing on high-tech and environmentally friendly industries to meet low-carbon standards.

These policies underscore Vietnam's commitment to the low-carbon transition and support domestic steel producers to maintain and expand their market share in the EU in the context of CBAM implementation.

6.2.2. Gaps

a. Lack of technical guidelines tailored to the steel industry

As of now, there are no specific technical guidelines on carbon inventory, reporting, and verification methods tailored to the steel industry. Current regulations related to CBAM issued by the Ministry of Industry and Trade are still quite general and do not provide detailed specifications, such as input material structure or emission factors for different steel products, making it difficult for enterprises to apply these regulations consistently and meet international standards (Ministry of Industry and Trade, 2023).

b. Limited financial support mechanisms for a green transition

Although Vietnam has introduced several green credit programs and environmental funds, the scale and lending conditions of these programs have not met the needs of the steel industry, as the steel industry requires high-cost investments in low-emission technologies (World Bank, 2023). Current policies lack long-term preferential interest rates, green asset depreciation subsidies, and credit guarantee schemes. This limits access to capital, especially for small and medium-sized enterprises (SMEs), which often do not have the financial capacity to pursue green upgrades.

7. Recommendations for Future Phases of CBAM

7.1. For Businesses

7.1.1. Establish a Comprehensive Carbon Footprint Inventory System and Participate in Voluntary Carbon Markets

To align with the CBAM, Vietnamese exporters must develop a detailed carbon footprint inventory. This includes measuring and reporting emissions from direct sources (Scope 1), purchased energy (Scope 2), and the broader value chain (Scope 3) (McKinsey, 2024). From 1 October 2023, CBAM requires accurate and transparent emissions reporting, ideally supported by real-time data systems that allow third-party verification. These tools not only support compliance but also help businesses manage carbon intensity and assess cost-effective reduction strategies (GREENCIC, 2024).

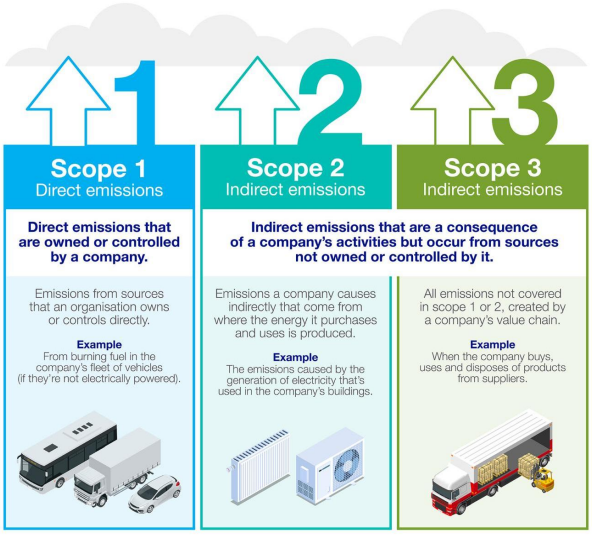

Figure 6: *Scopes of Emissions*
Source: *National Grid (2024)*

Participation in voluntary carbon markets (VCMs) can also help Vietnamese firms build experience in emissions tracking and carbon governance. Though CBAM doesn't currently

accept offsets, joining VCMs enhances readiness for future carbon pricing. According to ICAP (2023), firms active in VCMs often show stronger resilience and long-term climate strategy alignment.

7.1.2. Collaborate with EU Partners for Cost Sharing and Standardization

To better handle the demands of the EU's CBAM policy, Vietnamese businesses can benefit from closer collaboration with their European partners, especially in areas like cost sharing and product alignment. Joint investments in cleaner production technologies - such as renewable energy systems and low-carbon industrial processes - can help reduce emissions while sharing transition costs. These collaborative efforts not only ease financial pressure but also accelerate technological upgrades aligned with EU climate expectations (Vietnam Investment Review, 2024).

In addition, EU-backed technical assistance and training programs provide vital support to Vietnamese enterprises, particularly small and medium-sized ones, in building their internal capacity for carbon measurement and reporting.

7.2. For Policy Maker

7.2.1. Implement National Standards for Green Steel and Develop Domestic Carbon Certification Mechanisms

A key step in Vietnam's CBAM response is establishing a national "green steel" standard to guide producers toward low-emission technologies like electric arc furnaces and renewable energy. The Vietnam Steel Association is working with state agencies to help businesses align with CBAM while promoting sustainable manufacturing.

In parallel, Vietnam must accelerate the creation of a carbon content certification system for exports. From 2025, the Ministry of Natural Resources and Environment will assign emission quotas to key sectors, including steel, as part of a national carbon market. This certification is essential for maintaining access to the EU market and proving Vietnam's climate commitments (S&P Global, 2024).

7.2.2. Provide Access to Green Credit and Finance and Establish a Technical Assistance Fund for SMEs

Vietnam's transition to a low-carbon economy necessitates substantial financial investment, particularly in emission-intensive sectors such as steel, cement, and textiles. To support these efforts, the government can expand green finance programs by providing low-interest loans, tax breaks, and funding to help businesses invest in environmentally friendly technologies. The establishment of a national green credit framework, in collaboration with financial institutions, can play a pivotal role in mobilizing the required capital. PwC Vietnam notes that although green finance rules in the country are improving, problems like inconsistent

policies and unclear definitions of what counts as a green project still pose risks to successful rollout and investor trust (PwC, 2024).

In addition, small and medium-sized enterprises (SMEs) in Vietnam face significant challenges in adapting to the CBAM due to limited resources and technical expertise. One way to tackle this is by setting up a special support fund to help small and medium businesses with training, tools for tracking emissions, guidance on carbon reporting, and money to modernize their equipment.

8. Conclusion

The introduction of the CBAM policy presents both opportunities and challenges to Vietnam's steel exports. In the context of global trade's structural changes in supply chains triggered by the US-China trade war, there will be a supply chain shift in steel imports from China to Vietnam under the CBAM pressure because of the EU's objective to reduce dependence on China and Vietnam's EAF technology application during the steel production process. There is an opportunity for Vietnam to attract FDI under CBAM when Vietnam's policies pledge to decrease greenhouse gas and actively invest in innovating green technology. However, Vietnam also faces the challenge of CBAM's substantial compliance costs and the risk of losing competitive advantage in case of not fully submitting certification.

Under CBAM's pressure, large steel manufacturers make adaptive efforts, including investing in green steel and launching programs to prepare for full policy implementation in 2026. Meanwhile, at the macro level, Vietnam responded to the CBAM by Net-Zero 2050 Commitment and Updated Nationally Determined Contribution (NDC) in 2022. Furthermore, there is a development of green steel industrial clusters to reduce CO_2 emissions. However, there are gaps of lacking in technical guidelines tailored to the steel industry and an insufficient financial budget for the green transition.

In the future phases of CBAM policy, steel enterprises should establish a comprehensive carbon footprint inventory system and participate in voluntary carbon markets to improve skills in carbon accounting and emissions governance. Collaboration with European partners for cost sharing and standardization helps to gain EU - backed technical assistance and training programs for Vietnam's businesses. Policy makers should implement national standards for green steel and accelerate the process of constructing a domestic carbon certification system to align with CBAM policy. There should be provisional access to green credit and finance, and the establishment of technical assistance funds for SMEs. The government and domestic steel enterprises should make efforts to quickly adapt to this policy and take a competitive advantage to expand steel exports in the full implementation phase in 2026.

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REFERENCES

Vietnamese Materials

Cục Biến đổi khí hậu, 2024. *Cam kết net zero vào năm 2050*. Available at: https://dcc.monre.gov.vn/cam-ket-net-zero-vao-nam-2050-1502.htm

Chu, T.H., Nguyen, L.M. and Pham, Q.H., 2023. *Final CBAM Assessment Report*. VNLawFind. Available at: https://vnlawfind.com.vn/wp-content/uploads/2023/05/Final-CBAM-Assessment-Report_20230503.pdf

HPG Group, 2025. *Hòa Phát hoàn thành kiểm kê khí nhà kính toàn Tập đoàn*. Available at: https://www.hoaphat.com.vn/cong-nghe/hoa-phat-hoan-thanh-kiem-ke-khi-nha-kinh-toan-tap-doan.html

Thủ tướng Chính phủ, 2025. *Quyết định 232/QĐ-TTg phê duyệt Đề án phát triển thị trường các-bon tại Việt Nam*. Available at: https://thuvienphapluat.vn/van-ban/Tai-nguyen-Moi-truong/Quyet-dinh-232-QD-TTg-2025-phe-duyet-De-an-phat-trien-thi-truong-cac-bon-tai-Viet-Nam-641620.aspx

Vietnam Steel Association, 2024. *Tình hình thị trường thép Việt Nam tháng 10/2024 và 10 tháng đầu năm 2024.* Available at: https://vsa.com.vn/tinh-hinh-thi-truong-thep-viet-nam-thang-10-2024-va-10-thang-dau-nam-2024/

Vietnam Steel Association (2025). *Báo cáo Thị trường Thép Quý 1/2025*. [online] Available at: https://mediacdn.vietnambiz.vn/1881912202208555/files/2025/05/03/bao-cao-thi-truong-thep-quy-i-2025-2025050315495784.pdf

English Materials

Brandi, C., 2021. *Priorities for a development-friendly EU Carbon Border Adjustment Mechanism (CBAM).* German Institute of Development and Sustainability (IDOS). Available at: https://www.idos-research.de/en/briefing-paper/article/priorities-for-a-development-friendly-eu-carbon-border-adjustment-mechanism-cbam/

ERCST – European Roundtable on Climate Change and Sustainable Transition, 2021. *CBAM and implications for Asian steel exporters: Vietnam case study*. Available at: https://ercst.org/wp-content/uploads/2021/08/Preliminary-Study-on-the-economic-impact-that-EU-CBAM-could-potentially-impose-on-foreign-exporters-of-products-to-the-EU-market-Thailand-India-and-Vietnam.pdf

European Commission, 2024. *About the EU Emissions Trading System (EU ETS).* Available at: https://climate.ec.europa.eu/eu-action/eu-emissions-trading-system-eu-ets/about-eu-ets_en.

European Parliament and Council, 2023. *Regulation (EU) 2023/956 of 10 May 2023 establishing a carbon border adjustment mechanism.* Official Journal of the European Union. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32023R0956

ICAP, 2023. *Emissions Trading Worldwide: 2023 ICAP Status Report.* Available at: https://icapcarbonaction.com/en/publications/emissions-trading-worldwide-2023-icap-status-report.

Icap Carbon Action Partnership, 2024. *EU Emissions Trading System (EU ETS).* Available at: https://icapcarbonaction.com/en/ets/eu-emissions-trading-system-eu-ets

PricewaterhouseCoopers, 2025. *Green Finance in Vietnam: Pathway to Sustainable Economic Development.* Available at: https://www.pwc.com/vn/en/insights-hub/perspective-blog/green-finance-development.html

S&P Global Commodity Insights, 2024. *Vietnam expedites domestic carbon market development to tackle CBAM, Article 6.* Available at: https://www.spglobal.com/commodity-insights/en/news-research/latest-news/energy-transition/052424-vietnam-expedites-domestic-carbon-market-development-to-tackle-cbam-article-6

Vietnam Investment Review, 2025. *Europe slaps provisional tariffs on Vietnamese steel*. Available at: https://vir.com.vn/europe-slaps-provisional-tariffs-on-vietnamese-steel-126339.html

VietNam Steel Corporation, 2023. *Financial support needed for steel firms to go green: expert.* Available at: https://vnsteel.vn/en/general-news/financial-support-needed-for-steel-firms-to-go-green-expert-63.html

VietNam Steel Corporation, 2023. *Steelmakers must act now in CBAM entry.* Available at: https://vnsteel.com/en/general-news/steelmakers-must-act-now-in-cbam-entry-68.html

WTO Center, 2024a. *TTWTO VCCI - Challenges for Vietnam's exports to EU*. Available at: https://wtocenter.vn/an-pham/25872-challenges-for-vietnams-exports-to-eu

WTO Center, 2024b. *TTWTO VCCI - Vietnam's businesses urged to get ready for CBAM.* Available at: https://wtocenter.vn/tin-tuc/25605-vietnams-businesses-urged-to-get-ready-for-cbam?utm_source