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CƠ CHẾ ĐIỀU CHỈNH BIÊN GIỚI CARBON CỦA LIÊN MINH CHÂU ÂU CHÍNH THỨC CÓ HIỆU LỰC: CƠ HỘI VÀ THÁCH THỨC ĐỐI VỚI NGÀNH XI MĂNG VIỆT NAM

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Tóm tắt

Cơ chế Điều chỉnh Biên giới Carbon (CBAM) của Liên minh châu Âu (EU) đánh dấu một bước chuyển lớn trong thương mại toàn cầu và chính sách môi trường tại các quốc gia, với mục tiêu đảm bảo sự bình đẳng giữa hàng hóa sản xuất trong EU và hàng hóa nhập khẩu thông qua việc tích hợp chi phí carbon tại biên giới. Bắt đầu từ năm 2026, CBAM sẽ được áp dụng đầy đủ đối với một số ngành có cường độ phát thải cao, bao gồm xi măng, thép, nhôm, phân bón, điện và hydro. Là một trong những quốc gia xuất khẩu xi măng và clinker hàng đầu thế giới, Việt Nam đang đối mặt

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với áp lực ngày càng lớn từ cơ chế này do cường độ phát thải carbon cao của ngành xi măng. Nghiên cứu này phân tích các tác động tiềm tàng của CBAM áp dụng tại EU đối với ngành xuất khẩu xi măng của Việt Nam. Sử dụng phương pháp nghiên cứu định tính, nhóm nghiên cứu chúng tôi sử dụng dữ liệu phát thải và so sánh chính sách khí hậu giữa châu Âu và Việt Nam nhằm xác định những điểm hạn chế chính của ngành xi măng trong nước, đồng thời chỉ ra các cơ hội chuyển đổi sang mô hình công nghiệp phát thải thấp và bền vững. Cuối cùng, nghiên cứu đưa ra một số khuyến nghị về chính sách và công nghệ nhằm hỗ trợ ngành xi măng Việt Nam thích ứng hiệu quả với CBAM, đồng thời góp phần thúc đẩy các mục tiêu rộng lớn hơn về khí hậu và thương mại.

Từ khóa: CBAM, EU, Việt Nam, xi măng, rò rỉ carbon

CARBON BORDER ADJUSTMENT MECHANISM COMING INTO FULL EFFECT: OPPORTUNITIES AND CHALLENGES FOR VIETNAM'S CEMENT INDUSTRY

Abstract

The European Union's Carbon Border Adjustment Mechanism (CBAM) represents a significant shift in global trade and climate governance, aiming to level the playing field between domestically produced and imported goods by incorporating carbon costs at the border. Starting from 2026, CBAM will be fully enforced across several carbon-intensive sectors, including cement, steel, aluminium, fertilisers, electricity, and hydrogen. As one of the world's leading exporters of cement and clinker, Vietnam faces increasing pressure from this mechanism due to the high carbon intensity of its cement sector and its continued reliance on fossil fuel-based production processes. This research examines the potential impacts of the EU's CBAM on Vietnam's cement export industry, with a particular focus on market exposure, technological readiness, and policy coherence. Adopting a qualitative research approach, the study draws on emissions data, trade flow analysis, and a comparative review of European and Vietnamese climate policies to identify the structural vulnerabilities of Vietnam's cement sector, as well as the opportunities for transitioning toward a low-carbon, sustainable industrial model. The research then offers a set of policy and technological recommendations to support the Vietnamese cement industry in responding effectively to CBAM, while also advancing broader climate and trade objectives.

Keywords: CBAM, EU, Vietnam, cement, carbon leakage

1. Introduction

Vietnam is one of the world's largest producers and exporters of cement and clinker. According to the World Population Review, Vietnam's cement production capacity reached approximately 110 million tonnes in 2023, ranking third globally. However, the industry still mainly relies on coal-based production technologies, which results in high greenhouse gas emissions (Hon Chung Lau & Tsai, 2024).

In response to global efforts to reduce emissions, the EU introduced the CBAM. This policy sets a carbon price on imports from high-emission sectors like cement to ensure fair competition between EU-made goods and imports from countries without similar carbon barriers (European Commission, 2025). This creates challenges for Vietnam's cement industry, but also incentives for Vietnam's cement industry to upgrade technology and improve environmental performance. With the right policies, the sector could take advantage of this to improve its long-term competitiveness in global green industrial trends (Michaelowa et al., 2023).

The objective of this study is to evaluate the impact of the EU's CBAM on Vietnam's cement export sector through qualitative research methods. It investigates how CBAM may influence the country's export volumes and overall competitiveness, while also assessing the industry's readiness to adapt to carbon pricing and stricter emissions reporting requirements. The scope of the study focuses on Vietnam's cement industry, particularly from 2020 onward, with trade performance, carbon intensity, and the coherence between national policies and international climate commitments. By doing so, the study aims to provide insights into both the challenges and opportunities facing Vietnam's cement sector in the context of global low-carbon transitions. It also offers practical suggestions for both government and businesses on how to navigate CBAM effectively while enhancing long-term sustainability and market resilience.

2. Literature Review

2.1. Review of Past Work

The relationship between CBAM and Vietnam's cement export is a relatively new subject with little research being conducted. However, the existing papers on this subject have provided valuable insights.

At the global level, the CBAM - a type of carbon tax applied by European nations - is likely to exert significant effects on various industries, especially the cement industry. The research of Tsai & Lin (2024) shows that cement production scale and emissions are significantly affected by carbon tax policies, since changes in the level of taxation directly result in changes in cement prices and thus consumer demand. According to Overland & Sabyrbekov (2022), Iran, Ukraine, the USA, etc. - all countries with high carbon intensity and low technological innovations - will be most significantly affected by the CBAM. Despite high carbon intensity (1.23 kg CO_2/USD GDP), Vietnam ranks 23rd, with moderate potential resistance.

Similar to other countries, the cement industry is one of Vietnam's four key sectors tremendously impacted by the CBAM (Chu et al., 2023). According to Nguyen & Hens (2015), Vietnam is one of the biggest cement producers in the ASEAN with its supply now exceeding demand. However, the industry also proved to have a long history of environmental problems and impacts as cement plants have the highest hazardous content in their pollution to the air than any other industry sector. This is due to the cement production processes, which contain clinker calcination and cement grinding. Both still generate a significant amount of dust along with emissions such as CO_2, CO, NO_x, and SO_x, mainly contributing to air pollution. This goes against Vietnam's goals to sustain economic growth without compromising environmental quality as stated by Hung, N.T. (2023). Moreover, the transition from "grey" to "green" of Vietnam's cement production is also emphasized by the Ministry of Industry and Trade of Vietnam (2025) with a target of an 8% reduction in CO_2 emissions by 2030 compared to the current baseline.

With that in mind, Vietnam's interest in the EU's CBAM is closely tied to its green transition ambitions. While CBAM alone is not expected to have a major impact on Vietnam's overall economy, it is prompting discussions and actions around carbon pricing and cleaner production, especially in key export sectors including: steel, cement,....(Chu et al., 2024). It is also reported that even a relatively low initial carbon price ranging from US$1.85 to US$3.86/tCO2, starting from 2022 with a real annual increase of 10%, would be capable of making a key contribution to the achievement of Vietnam's updated NDC and to reducing greenhouse gas and local air pollution emissions (Do & Burke, 2021). Do & Burke (2021) also argue that carbon pricing will be a valuable tool to offset the effect of the CBAM, generate public revenue, and prepare the political foundation for introducing an Emissions Trading System (ETS) in Vietnam.

On the other hand, the “Carbon Pricing in ASEAN+3 Economies: Progress and Challenges” (Andriansyah et al., 2022) indicates that in Southeast Asian countries like Vietnam, carbon pricing could raise production costs, which are passed to consumers via higher energy and product prices. Moreover, the ASEAN+3 average carbon price is USD 6.45 - much lower than the global average (USD 31.18), so it is difficult to reach the recommended USD 75 to meet climate targets. These overall impacts on the economy may exert indirect influence on the cement industry of Vietnam. Additionally, (To, 2024) stated that Vietnam must expedite legal and policy development to comply with CBAM and mitigate the risk of carbon leakage, where polluting industries may relocate to avoid emissions costs.

Many solutions have been proposed to deal with the CBAM, among which the most prominent include providing policies or subsidies for greenhouse gas (GHG) emission reduction technologies, focusing on R&D to treat hazardous waste without the need for reapproval of environmental reports, and to improve the quality of cement (Chu et al., 2023). Similarly, the Development and Policies Research Center also emphasizes that Vietnam should streamline procedures and support policies for waste heat recovery projects, focus on research and development to improve efficiency, and reduce CO2 emissions in cement production.

2.2. Research Gap

Although increasing numbers of studies analyze the CBAM implications for industries worldwide, Vietnam's cement exporting sector is limited and scarce in the related research. Current research has focused mostly on macroeconomic impacts, carbon pricing schemes, and overall sectoral impacts in the high-carbon intensity countries (Do & Burke, 2021; Overland & Sabyrbekov, 2022). However, there are limited studies that have examined extensively the sectoral implications of the CBAM on Vietnam's cement sector - a strategic export sector that is also facing overcapacity, high emissions, and pressure to transition to cleaner production (Nguyen & Hens, 2015; Chu et al., 2023).

Furthermore, though researchers such as Tsai & Lin (2024) have examined the general responsiveness of cement production to carbon taxation, empirical evidence regarding the impact of the CBAM on Vietnam's competitiveness, price policy, and market penetration in the EU remains scarce. In addition, the literature has not satisfactorily addressed the readiness of Vietnam's

policy and legal frameworks to address the CBAM demands or the readiness of the industry to adopt emissions-reducing technologies and benefit from potential green transition incentives (To, 2024).

One more dimension that has been largely unexplored is the role that carbon pricing and ETS might play as adaptive responses in Vietnam, and in particular, how such instruments might mitigate CBAM-related challenges and create opportunities for green innovation in the cement sector. While initial discussions have started by Do & Burke (2021) and Andriansyah et al (2022), there is still a lack of concrete studies linking these policy tools to export resilience in the cement sector. Moreover, as the CBAM has not yet been fully implemented, previous studies have yet to address specific case studies on the impact of this policy on individual enterprises.

Therefore, the current research will aim to fill these research gaps by examining both direct and indirect effects of the CBAM on Vietnam's cement export sector, ascertaining Vietnam's readiness, and strategic responses that harmonize trade competitiveness and environmental issues.

3. Theoretical Framework

3.1. Overview of the Emission Trading System (ETS)

According to Böning et al. (2023), the ETS is an emission pricing mechanism emerging in 2005 to comply with prior commitments bound in the Kyoto protocol, acting as a regulator that imposes a ceiling on the maximum amount of GHG emissions allowed to be released in specific economic sectors. Each covered entity is required to surrender a certain number of allowances that correspond to their emissions within a specified time period. Installations can sell any excess to other members if their emissions are fewer than the amount of credits they already possess. As a result, organizations with low abatement costs are motivated to cut their emissions, while those with higher costs may decide to ensure conformity by buying market-based allowances.

Under the current EU ETS, a cap is set on the total GHG emissions of electricity and heat generation, energy-intensive industries, and commercial aviation. The trading scheme covers 40% of total EU emissions and the members of the European Economic Area, i.e., Iceland, Liechtenstein and Norway, and Switzerland, also take part in it (Borghesi & Flori, 2018).

3.2. Understanding the CBAM

3.2.1. Definition

The Carbon Border Adjustment Mechanism (CBAM) is one of the EU's most innovative and determined efforts in combating climate change. Upon levying a fair tax on carbon-intensive goods and inputs flowing into the EU, especially from non-ETS-applicable countries, the CBAM aims to hinder EU industries from outsourcing their production to nations in which equivalent levels of carbon pricing are not adopted (Magacho et al., 2024).

Besides its fundamental goal of offsetting the carbon prices between domestic and imported products, the CBAM also serves multiple other purposes, including its originating union's ambitious target of reaching climate neutrality by 2050, inducing overall green industry practices in non-EU countries, as well as substantially contributing to global decarbonization.

3.2.2. Timeline of Implementation

The CBAM will eventually be fully phased in after two main stages: the transitional phase and the definitive period.

- **The transitional phase**

During the transitional phase initiated on 1st Oct 2023 and ended by December 2025, the CBAM targets goods that are at most risk of leakage, including: cement, iron and steel, aluminium, fertilizer, hydrogen, and electricity. Such an ample scope articulates the EU's vision of capturing more than 50% of the emissions in ETS-covered industries.

The objective of this transitional period is to serve as a pilot and learning period for all stakeholders, ranging from importers, producers to authorities, to collect useful information on embedded emissions to refine the methodology for the definitive period. During this period, importers of goods in the aforementioned list only have to quarterly report GHG embedded in their imports (direct and indirect emissions), without having to buy and surrender certificates.

Since early 2025, CBAM declarants have been able to apply for the 'authorised CBAM declarant' status via the CBAM Registry. This status will become compulsory as of 1 January 2026 for the import of CBAM goods in the EU customs territory.

- **The definitive phase**

From 2026, a definitive regime will come into effect, mandating importers of carbon-intensive goods to start paying taxes based on the carbon price in Europe's ETS, and the number of industries subject to reporting emissions to increase. In accordance with this regime, EU producers outsourcing CBAM-covered goods are subject to purchasing CBAM certificates. The price of the certificates is computed based on the weekly average auction price of EU ETS allowances expressed in €/tonne of CO2 emitted. From that point onwards, annually by 31 May, the EU importer must submit a report declaring the amount of embedded emissions in imported goods into the EU during previous years, while also surrendering the number of CBAM certificates equivalent to the volume of GHG emitted in the goods.

However, in the event that importers can evidently prove the payment of a carbon price during production phases of the imported products, the corresponding amount can be subtracted from the final bill (European Commission., 2021).

4. Vietnam's Cement Industry Background

A fundamental understanding of Vietnam's cement industry is essential for analyzing the potential impacts of CBAM on this sector.

4.1. From Production to Emissions

Regarding its history and development, in 1910, the first cement factory of the country was established by the French in Hai Phong (Viegoglobal.com, 2024). Post 1954, the division of Vietnam highlighted the adoption of a centrally planned economy in which heavy industries, including cement production, are prioritized. Ever since then, the cement industry in Vietnam has been a crucial sector in the industrial development of the nation.

It is also important to understand the steps involved in cement production, as this provides a clearer basis for evaluating its environmental impacts. The process consists of the following seven key stages: Extraction of raw materials, Proportioning and pre-grinding, Kiln feeding, Calcination, Clinker cooling, Grinding and gypsum addition, and Packaging and distribution.

In this process, the general environmental impacts have been summarized by Nguyen and Hens (2015) as follows:

- Air pollution: Significant amounts of dust are produced during the grinding, clinker manufacturing, and packaging stages.
- High fuel consumption: The baking process consumes large quantities of fuel, such as coal, diesel oil, and electricity.
- Noise pollution: Grinding and crushing operations generate considerable noise.
- Water discharge: Solid waste and wastewater are discharged during the production process.
- Greenhouse gas emissions: Clinker kilns still release various gases into the environment, including carbon dioxide (CO_2), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), and carbon monoxide (CO)

It could be seen that clinker production is the most pollution-intensive and carbon-heavy, making it the primary target of carbon pricing mechanisms like CBAM. Specifically, in 2022, Vietnam's cement sector was responsible for approximately 109 million tonnes of CO2 emissions, representing around 33% of the country's total greenhouse gas output (see Figure 1 and Figure 2). This corresponds to an emission intensity of 0.85–0.925 tonnes of CO2 per tonne of cement, approximately 15% above the global average. Vietnam's emission intensity in this sector exceeds that of several regional economies, including Thailand and the Philippines (Hon Chung Lau & Tsai, 2024). The elevated emissions can be attributed primarily to a high clinker content in cement production, suboptimal energy efficiency, and the limited utilisation of alternative fuels and supplementary cementitious materials (United Nations Industrial Development Organization (UNIDO), 2024).

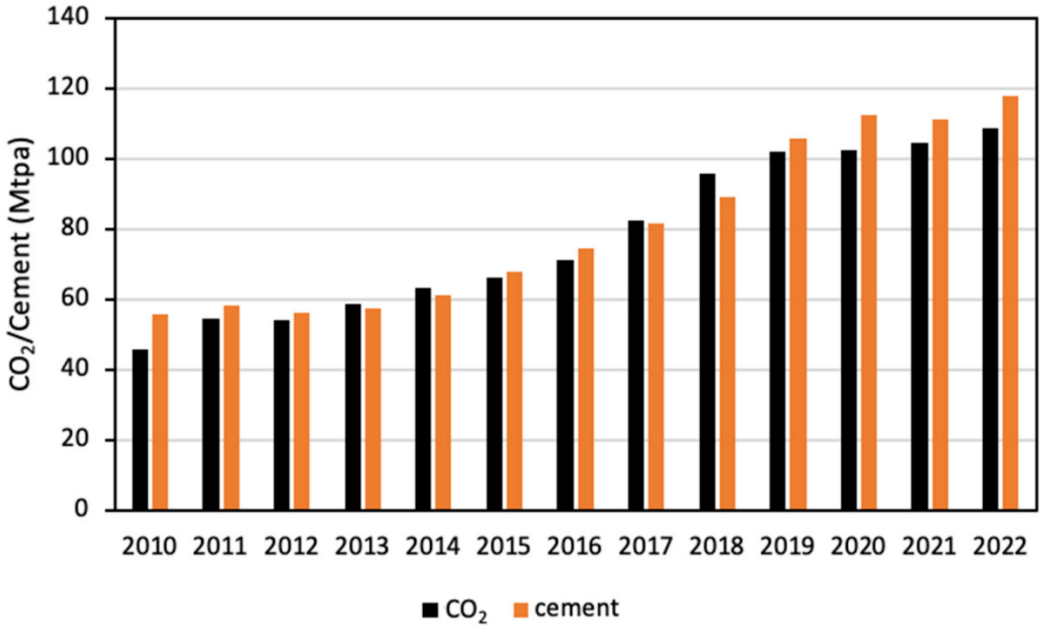

Figure 1: Annual levels of cement production and CO2 emissions from the cement industry in Vietnam (in Mtpa)

Source: Hon Chung Lau & Tsai, 2024

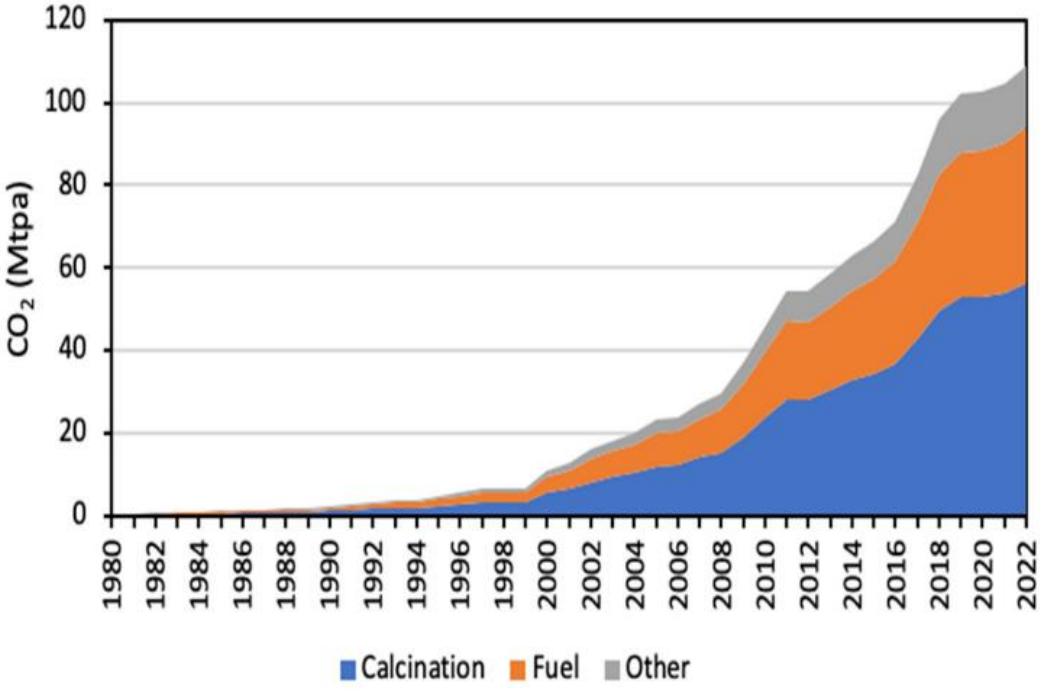

Figure 2: Annual CO2 emissions from Vietnam's cement industry (in Mtpa)

Source: Hon Chung Lau & Tsai, 2024

4.2. Vietnam's Cement Industry Profile

According to the World Population Review, Vietnam's cement production capacity reached approximately 110 million tonnes in 2023, ranking third globally. Currently, Vietnam has over 103 cement production lines within 63 plants with a total capacity of about 100 million tonnes per year. This number is expected to increase more with several ongoing projects. The industry's total designed capacity is expected to reach 123 million tonnes per year once these projects are completed (T. Nguyen, 2023).

	COUNTRY	CEMENT PRODUCTION 2023 (T) ↓	CLINKER CAPACITY 2023 (T)	CEMENT PRODUCTION 2021 (T)	CLINKER CAPACITY 2021 (T)
	China	2.1B	2B	2.4B	2B
	India	410M	300M	350M	280M
	Vietnam	110M	110M	110M	90M
	United States	91M	100M	93M	100M
	Turkey	79M	92M	82M	92M
	Iran	65M	81M	62M	81M
	Brazil	63M	60M	66M	60M
	Indonesia	62M	79M	65M	79M
	Russia	57M	80M	61M	80M

Figure 3: Top cement producing countries (in USD)

Source: World Population Review, 2023

Domestically, the total cement consumption in the domestic market in 2022 amounted to 62.68 million tonnes, accounting for more than 62% of the total production (FiinGroup, 2024). This shows a moderate but stable domestic demand, driven by continued infrastructure development and real estate projects. However, the gap between production and consumption necessitates a strong focus on export markets to absorb the remaining 38% of surplus output.

Considering Vietnam's cement export performance, in 2023, Vietnam exported over 31.3 million tonnes of cement and clinker, generating around US$1.32 billion, or approximately 0.37% of the country's total export value of US$353.08 billion (tradingeconomics.com, 2023). This continues to show that cement export represents a small fraction of the country's overall exports.

Moreover, although Vietnam is a major player in global cement exports, its exposure to the EU market remains relatively limited. In 2023, Vietnam accounted for 1.7% of the EU's total cement and clinker imports (The European Cement Association, 2024). This placed Vietnam behind key suppliers such as Turkey (35.8%), Algeria (19.2%), and Ukraine (12.6%) (see Figure 4). Plus, exports to the EU represented less than 2% of Vietnam's total cement export volume (Kim et al., 2024) (see Figure 5).

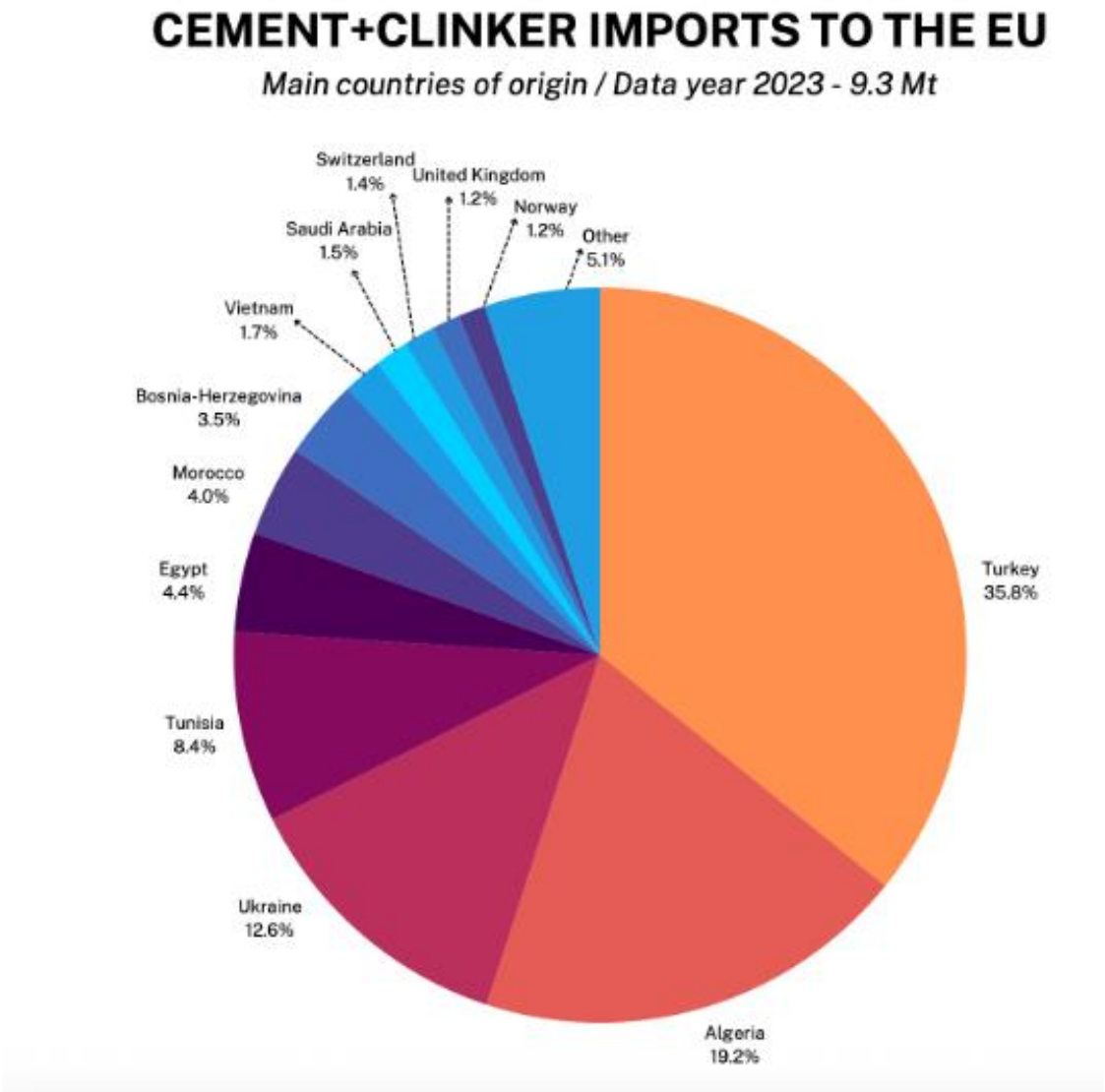

Figure 4: Countries exporting cement and clinker to the EU (in percentage)

Source: The European Cement Association, 2024

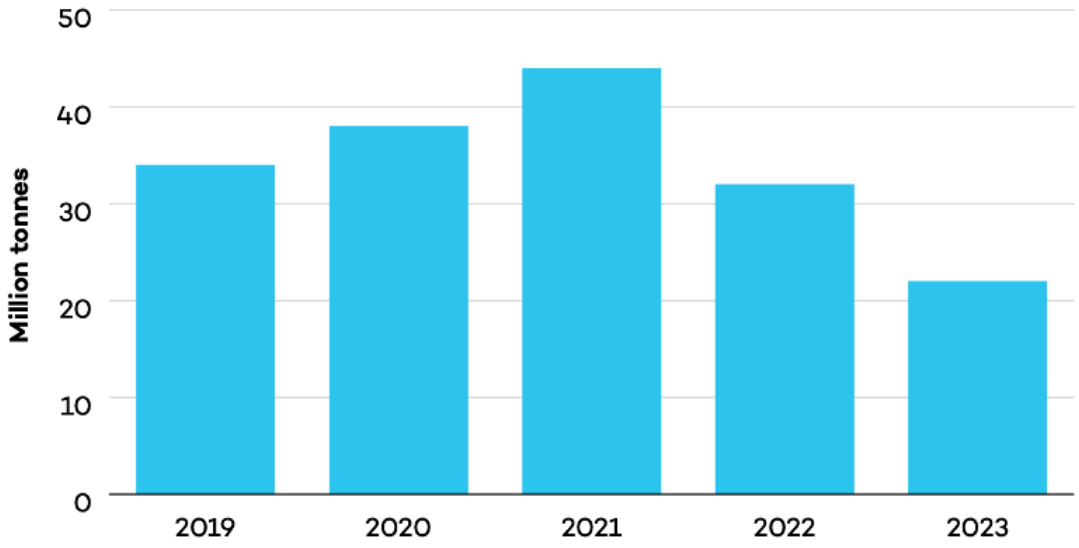

Figure 5: Export of Vietnamese cement to the EU (in million tonnes)

Source: Kim et al., 2024

Given this low dependency on the EU market, the direct economic impact of CBAM on Vietnam's cement industry is expected to be minimal. However, the mechanism could still drive long-term changes in production practices and investment in cleaner technologies, especially for clinker production, which is highly carbon-intensive.

4.3. Regulatory Approaches to Cement Emissions: Vietnam Compared to the EU

Compared to Vietnam, the EU has taken a more aggressive approach to cutting cement-related emissions. While Vietnam has set quite humble targets to lower carbon emissions in the cement industry—down to 650 kg of CO_2 per ton by 2030 and 550 kg by 2050 (AsemconnectVietnam, 2021), EU producers are aiming for at least a 30% reduction by 2030 and net-zero by 2050, following a long history of strict environmental action (EMBUREAU, 2020). A key tool is the ETS, where cement plants must pay for their carbon emissions, pushing them to invest in greener technologies. Vietnam, meanwhile, has no national carbon pricing scheme yet, though it does monitor and regulate emissions.

Both regions require environmental assessments and pollution control, but the EU sets more detailed technical standards. EU plants must use Best Available Techniques (BAT) to control

pollutants like NO_x and dust, with stricter emission limits and required technologies. Vietnam has similar rules, such as waste heat recovery (WHR) systems for large plants and GHG reporting, but the enforcement and technical depth are lighter. On chemical management, Vietnam also requires regular compliance reporting, but its chemical control and audit frameworks are still developing and not yet as comprehensive or enforceable as the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) in the EU. For example, hexavalent chromium content in cement is tightly regulated. Additionally, EU plants must submit annual emissions reports and undergo audits in line with ETS protocols.

Such discrepancies in the legal framework of Vietnam and the EU imply potential room for Vietnam's regulatory enhancement in navigating the cement industry towards a greener approach, which will be clarified in the recommendations later on.

5. Impacts of the CBAM on Vietnam's Cement Sector

Since the EU introduced the CBAM, Vietnam's cement industry has begun to face significant changes in both its export orientation and sustainable production strategies. CBAM requires EU importers to purchase "carbon certificates" corresponding to the amount of GHG emissions embedded in the imported products. The average carbon emissions of Vietnam's cement industry range from 850–925 kg CO_2 per ton of cement, which is 15% above the global average (Hon Chung Lau & Tsai, 2024). However, since exports to the EU currently account for around 1- 2% of Vietnam's total cement output, the application of CBAM in the EU would have only slightly negative impacts on the cement industry of Vietnam. The estimated reduction in cement production is around 0.1%, and the estimated reduction in exports is around 0.6% in 2030 (Chu et al., 2023).

5.1. Opportunities

Alongside Vietnam's green transition momentum, CBAM presents an opportunity for Vietnam's cement sector to accelerate its transformation towards low-carbon, climate-compatible production. According to Chu et al (2023), reducing emission intensity in the cement sector would significantly increase emission reductions from a reduction of around 0.1 to a reduction of 7.4 million tCO2 in 2030. Not only does this help decrease CO2 emissions to protect the environment and assist in the long-term vision of net-zero and Vietnam's Nationally Determined Contributions (NDC) by 2030,

but also enables businesses to reduce the cost of purchasing CBAM certificates to offset their emissions.

Enhancing production efficiency and embracing green technology are critical factors to guarantee the competitiveness and long-term development of broader energy and manufacturing sectors, particularly the cement industry. In the future, as more countries implement carbon border charges such as CBAM, Vietnamese cement producers will be in a position to take advantage of being already aligned with high emissions reduction standards and maintain and expand in potential markets beyond the EU, namely Japan, South Korea, and the United States, etc.

This is also an opportunity for Vietnam to set up a national carbon pricing mechanism and initiate an ETS. For the cement industry in particular, setting up an internationally harmonized measurement system is critically important under current conditions, when a detailed verification and reporting system on the content of carbon emissions is yet to be introduced. By managing and monitoring carbon technical data in cement production, businesses can take preemptive measures to adjust their production in a way that does not incur excessive CBAM fees.

Moreover, green transition measures will also help Vietnam's cement sector access more concessional funding from climate funds or technical support programs of the EU.

5.2. Challenges

However, the cement industry in Vietnam is still confronted with significant challenges. The application of the CBAM has substantial cost implications for Vietnam's cement industry, especially for exports to the EU market. Vietnamese producers will be subject to extra adjustment costs if they surpass the emission volume determined by the EU, thus escalating export prices and decreasing price competitiveness. Here, Vietnamese cement is also under a growing threat of losing its market share, especially to EU-based producers or competitors with greener production technologies.

In addition to explicit carbon payments, companies are obliged to comply with international standards regarding emissions transparency and reporting. In particular, the CBAM demands that companies implement full Monitoring, Reporting, and Verification (MRV) systems. Much investment will be needed for proper emissions measurement, consultants' advice, independent verification, and certification procedures. Compliance can be extravagant and frequently costs

more than the actual carbon taxes paid, therefore imposing a substantial financial burden, especially on small and medium-sized enterprises.

In the medium to long term, businesses must intensify R&D efforts to develop manufacturing technologies and lower CO_2 emission intensity. Some of the feasible alternatives include improving energy efficiency, lowering clinker content in cement, alternative fuel utilization (such as biomass or industrial waste), or implementing carbon capture, utilization, and storage (CCUS) technologies. However, transitioning to green technologies requires enormous capital investment, which many small and medium-sized cement producers in Vietnam struggle to afford.

Globally, the impact of the CBAM will only become more extensive, as other countries like Canada, the UK, and Japan are also considering introducing CBAMs. This also implies that CBAM is not merely some regulatory hurdle erected by the EU, but a trend within global trade that will require long-term strategic adaptation on the part of Vietnam's cement industry to sustain competitiveness on the global scene.

Furthermore, the government of Vietnam can anticipate heightened fiscal pressures in facilitating the adjustment of domestic enterprises to these developments. These include financing training programs, offering technical support, formulating supportive policies, and enhancing national environmental standards to fulfill international commitments. As much as these programs are needed to realize sustainable development, they also create enormous budgetary pressures and policy implementation challenges that demand cautious coordination between the private and public sectors.

6. Recommendations for Adaptation

To adapt to evolving global carbon regulations such as the EU's CBAM, the Vietnamese cement industry may explore a variety of strategic responses.

- **Diversifying Export Markets**

Reducing dependence on the EU market may be considered a potential strategy to respond to the increasing stringency of global carbon-related regulations. Some Vietnamese cement producers can explore opportunities in alternative markets that may not yet impose carbon border measures similar to the EU's CBAM. This may help spread trade-related risks more evenly and may reduce

the industry's vulnerability to policy changes in a single region. Exploring new markets can also offer exposure to different environments, which may allow firms more time and flexibility to adapt.

- **Investing in Green Technologies**

Enterprises in the cement sector may consider increasing their investment in cleaner and more sustainable technologies. Adopting innovations that can lower emissions or improve energy efficiency might enhance the operational performance of manufacturing processes. Although the cost of such investments can be a significant consideration, the long-term benefits may include reduced reliance on fossil fuels and a stronger alignment with global sustainability trends. The cleaner technologies may also improve the industry's ability to meet future compliance requirements as carbon regulations become more widespread (RECCESSARY, 2025).

- **Collaborating with EU-Based Firms**

Forming partnerships with companies based in the European Union can be another pathway that Vietnamese cement enterprises may consider. Such collaborations may create access to shared expertise, improved compliance practices, or even new technologies that are already adapted to European environmental standards. Working closely with EU firms might also ease the burden of meeting CBAM-related criteria by offering structured support or joint solutions. In some cases, these relationships may also foster mutual learning or co-development opportunities that could strengthen the industry's capacity to respond to shifting carbon policies (FLS, 2024).

- **Purchasing Domestic Carbon and Environmental Certificates**

Acquiring local carbon credits or environmental certificates is also a good choice. This method can offer a degree of flexibility in offsetting emissions, particularly in the short term, while other long-term strategies are still being developed or implemented. Although these certificates may not always be recognized internationally, they can serve as a signal of commitment to lower-carbon practices. Domestic mechanisms for environmental certification may also evolve to align more closely with global frameworks, which can further support businesses in demonstrating their efforts to regulators and trading partners.

- **Developing a National Carbon Pricing System**

Vietnam may consider the gradual development of a domestic carbon pricing system to better manage its emissions and reduce the outflow of carbon-related tax revenues. Introducing a national mechanism can send clearer economic signals that may encourage industries to reduce their carbon footprint. Over time, such a system might help build a structured market where emission allowances can be traded, creating incentives for companies to invest in cleaner production models. A well-structured framework may also support transparency and predictability, which can be important for long-term planning.

Establishing a national carbon pricing mechanism may offer Vietnam a foundational tool in aligning its industrial growth with the country's commitment to achieving Net Zero emissions by 2050. By assigning a tangible cost to greenhouse gas emissions, such a system can provide clear economic signals that may encourage businesses to invest in cleaner production methods.

A well-structured carbon pricing framework could also create a predictable and transparent market for emissions trading, potentially stimulating innovation in low-carbon technologies. It may allow companies with lower emissions to trade their surplus allowances, creating financial incentives for others to reduce their carbon footprint (Nguyen Kim, 2025).

- **Enhancing Environmental Policy Frameworks**

Strengthening environmental regulations might contribute to a more sustainable industrial base. Clearer policies can provide stronger incentives for green transformation (International Trade Administration, 2024).

- **Issuing Detailed Emission Reporting Guidelines and Supporting Businesses**

Introducing specific emission reporting guidelines aligned with mechanisms like CBAM may help businesses prepare for new international requirements. Clear instructions and standardized metrics can improve consistency in data reporting, which may, in turn, support better transparency. To complement these efforts, the government may also consider offering training programs or awareness campaigns to build capacity among domestic producers. These initiatives can be especially useful for small and medium-sized firms that may lack the resources to adapt independently (Khanh Linh, 2023).

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