Regulation and Impact from Enforcement of the EU's Carbon Border Adjustment Mechanism (CBAM) to Prepare for the Implementation of Thailand Industry in the Future

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Abstract

Carbon Border Adjustment Mechanism: CBAM is one the of important regulations under the European Green Deal plan, which the EU has declared. When the draft legislation for the CBAM has been approved by the European Parliament, the first phrase called the transitional period will run from 1 October 2023 until 31 December 2025.

During the transitional period, the CBAM will apply to six groups of imported products, namely: 1) iron and steel, 2) aluminum, 3) cement, 4) fertilizer, 5) electricity, and 6) hydrogen. Regarding the impact of CBAM on the Thailand's industry, the negative impacts included higher export costs as CBAM will determine the price that importers have to pay for importing of high-emitting products. This will decrease the export competitiveness as well. However, CBAM have positive impact. Thailand industry accelerates its adjustments to meet targets to reduce carbon emissions and increase trading opportunities and invest in green businesses. Thai exports of iron and steel will be affected mostly by CBAM regulation as Thailand exports a lot of iron and steel products to the European Union. The Aluminum industry will be the second most affected as the export proportion to the European Union is less than the iron and steel products.

In preparing for the implementation of CBAM, Thailand Greenhouse Gas Management Organization (Public Organization), namely: TGO., is an organization which certifies 3 groups of carbon footprint labels that including Carbon Footprint Reduction (CFR), Carbon Footprint of Circular Economy Product (CE-CFP), and Carbon Footprint of Product (CFP) as well as Voluntary Carbon Market Project. In addition to dependence on exports to the EU, other factors that will accelerate the CBAM impacts include the carbon intensity in manufacturing processes, the market

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power of importers to pass production costs through to exporters, and the existence of and access to replacement markets for both importers and exporters.

Keywords: Carbon border adjustment mechanism, European union, Emission trading system

1. Introduction

Climate change is an environmental crisis that affects all regions around the world, and its impacts tend to accelerate if no action is taken appropriately. Consequently, one of the most important international policies has emphasized on reducing greenhouse gas emissions, which are the crucial cause of global warming in order to achieve carbon neutrality and net zero emissions targets. (Take & et al., 2022) Global environmental changes have motivated both the government sector and the private sector to pay attention to environmental balance. Various measures have been developed to reduce greenhouse gas emissions, or carbon dioxide emissions (CO_2). The European Union is a region that has implemented measures to tackle climate change intensively. Since the start of 2005, the European Union has set up the EU emissions trading scheme (ETS), which became the world's first mandatory emissions trading system (Chaichumporn & Mallikamarl, 2022).

It is obvious that the impact on the natural environment has caused extensive damage to the world. This activates people to see the importance of taking the necessary actions to reduce global warming. The European Union is the first world leader in fighting against climate change. It has fixed the goal to reach Net Zero Emissions by 2025 (International Carbon Action Partnership, 2023). To achieve that goal, in July, 2021 the European Commission launched a policy called the European Green Deal that aims to reduce net greenhouse gas emissions by at least 55% by 2030 (EU Green Deal. 2023). Compared to greenhouse gas in 1990 (Fit for 55 Package). Under the European Green Deal there are important policies and measures as follows:

1. Revise the emissions trading scheme and greenhouse gas emissions rights.
2. Promote green transportation across land, water, and air in a long-term sustainable manner.
3. Determine the tax rate for green business.
4. Determine the proportion of renewable energy consumption.
5. Set a goal to absorb greenhouse gases.
6. Issue Carbon Border Adjustment Mechanism.

The Carbon Border Adjustment Mechanism: (CBAM) is one of important regulations of European Green Deal that the European Union has applied as a levy on imports of products made in countries that impose no or low carbon charge before entering the EU customs territory.

The GHG inventory covers the seven direct greenhouse gases under the Kyoto Protocol:

1. Carbon dioxide (CO_2)
2. Methane (CH_4)
3. Nitrous oxide (N_2O)
4. Hydrofluorocarbons (HFCs)
5. Perfluorocarbons (PFCs)
6. Sulphur hexafluoride (SF_6)
7. Nitrogen trifluoride (NF_3)

2. Carbon Border Adjustment Mechanism

Before CBAM was adopted and implemented, the main institutions of the European Union discussed how to regulate carbon emissions for a long time. In July 2021, the European Commission has proposed an initial proposal for a regulation of the European carbon border adjustment mechanism (CBAM). In June 2022, the European Parliament and the European Council proposed their own version of CBAM (Mechanism CBAM, 2023). The proposals of 3 institutions slightly differ in some options such as the scope of the target products, greenhouse gas monitoring, the implementation timeline, and the area in which the CBAM would be enforced. Of the three proposals, the European Parliament was the most comprehensive (European Commission, 2023).

However, after trilogue negotiations in December 2022, the agreement was reached. Then the CBAM will start with a transitional phase in October 2023. (Bundesamt, 2023).

The carbon border adjustment mechanism or CBAM is an important regulation under the "Fit for 55" climate-policy package which the European Union has adopted as part of the European Green Deal (with the aim of reaching net zero emissions by 2050). On 18 April 2023, the European Parliament approved the draft of the CBAM implementing regulation, and the regulation will be issued later (European Green Deal, 2023). The implementation of CBAM will begin with a transitional phase from 1 October 2023 to 31 December 2025. During the first phase, importers of goods will need to report the quantity of their imports and the embedded emissions. From 1 January, 2026 onwards, importers will be required to purchase CBAM certificates covering the CO_2 emissions associated with production (Mechanism CBAM, 2023).

During the transitional phase, the sectors subject to the CBAM would include iron and steel, aluminum, cement, fertilizer, electricity, and hydrogen. (Cover some downstream products e.g. screws and bolts of iron and steel, and aluminum cables (Carbon Border Adjustment Mechanism CBAM, 2023). Besides, Companies will face penalties of up to €10-50 per ton of carbon emissions if they fail to comply with CBAM reporting requirements from October 1, 2023, according to the new rules.

The CBAM regulation may impact the importers of carbon-intensive products, or those that are unable to measure their embedded emissions. The manufacturers and importers of goods into European Union are subjected to calculate, monitor, and report emissions from the production processes of imported goods. The CBAM indirectly places pressures on partners countries to develop low-carbon manufacturing processes as well as enhance measures to cope with climate change in the future (The EU Carbon Border Tax Will Redefine Global Value Chains, 2021). The CBAM will undoubtedly pose numerous challenges for other factors involved in business such as business risks, access to capital, and decision making of investors. These might directly and indirectly impact operators in Thailand, including business in the value chain of production processing from upstream to downstream as shown in Figure 1.

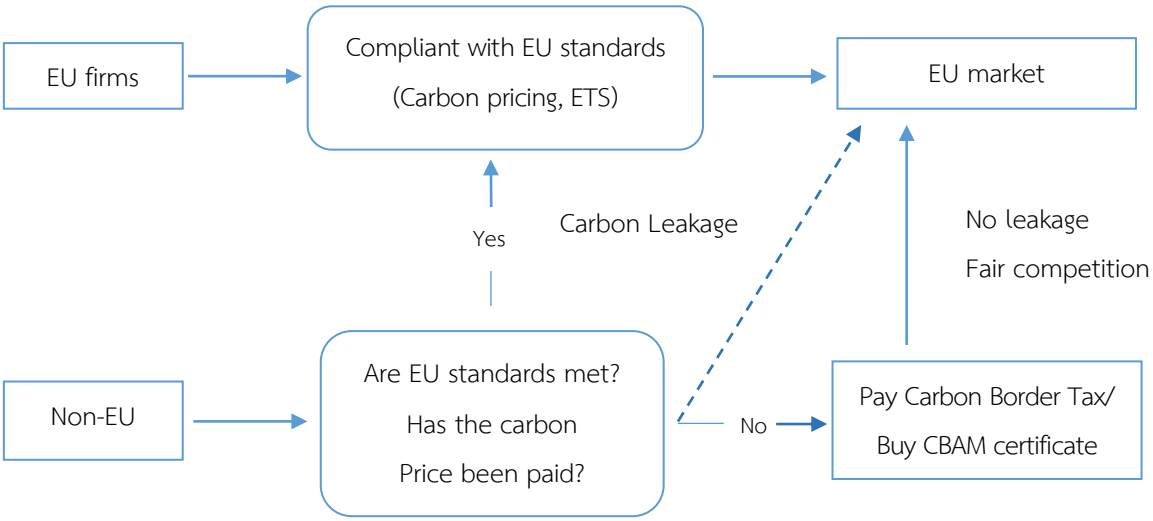


Figure 1 CBAM Mechanism

Summary of the EU's Carbon Border Adjustment Mechanism Regulation is as follows: CBAM Declaration between 2023 and 2025, importers will have to register as authorized declarants

and report on a quarterly basis the embedded emissions in their imports to the Common Central Platform. The CBAM Regulation will start applying on 1 October 2023.

CBAM certificates from the year 2026, importers will have to report all the embedded emissions. The amount of greenhouse gas emissions should be verified by an accredited verifier that register with the CBAM authority. However, the list of accredited verifiers is not officially informed until now. Moreover, the importers will need to purchase CBAM certificates corresponding to the embedded emissions above the EU-ETS benchmark levels by 31 May of each year. CBAM certificate equals ton of embedded emissions in the imports. The price of the CBAM certificates will be based on the average trading price of EU Emission Trading System (EU ETS) allowances in the week prior to the import. The trading of CBAM certificates will be made through the Common Central Platform of CBAM (Presidential Climate Commission towards A Just Transition, 2023).

Upon purchase, the authorized declarant is required to surrender a number of CBAM certificates through the CBAM registry to the competent authority for authorization to import their goods into the customs territory of the European Union.

3. Enforcement of the CBAM

During the transitional phase that will run from 1 October 2023 until 31 December 2025, importers will have to report total quantity of goods imported as well as greenhouse gas emissions embedded calculated according to the CBAM criteria. Figures (Xiaobei et al., 2022). The emissions report will require verification by an accredited verification body, but no carbon pricing. Recently, the European Union has imposed that the transitional phase will end on 31 December 2025. The full Carbon Border Adjustment Mechanism will be in effect from 1 January 2026. At this point importers will need to declare the quantity of goods and the embedded emissions imported into the Union. Importers will have to purchase and surrender CBAM certificates for the products' embedded emissions, at a price calculated depending on the weekly average auction price of the EU ETS allowances (Dumitru & KolblTh, 2021). Anyway, if the importers can provide verified information from third country producers which proves the carbon price has been paid, then the corresponding amount can be deducted in the final bill. Industries initially targeted by the EU-CBAM as shown in Figure 2.

Figure 2 The EU-CBAM's targeted industries in transitional phase

4. The Impact of the Carbon Border Adjustment Mechanism (CBAM) on Thailand industries

CBAM is a tool that the European Union implements to reach its net zero emissions targets by 2050 under the European Green Deal. This regulation will directly affect imports from Thailand to the European Union in the form of carbon tariff, the revision of the EU Emissions Trading System (EU ETS) to cover all goods that ETS aims to reduce greenhouse gas and promote economic growth. The progress in encouraging the CBAM regulation has showed that from December 2019 until May 2020, the EU has approved the environmental impact assessment plan, and is expected to give recommendations on the elements of the CBAM to the European Commission in July 2021 (The EU Carbon Border Tax Will Redefine Global Value Chains, 2021).

The application of EU emission trading system (ETS) has encouraged operators to adopt eco-friendly technologies that makes the cost higher. To avoid carbon leakage, some operators relocate their manufacturing operations to countries outside of the EU where a lower, or no carbon price is levied. The is unfair for producers under ETS, who lose a competitive advantage in trading. Therefore, CBAM is introduced to control that operation. The application of CBAM to the targeted industries may affect Thailand's exports to the EU which is about 28,573 million baht (Beaufils & et al.,2023). As the CBAM application forces import companies to purchase CBAM certificates, it increases the costs and prices of the products imported to EU. Consequently, importers may reduce the number of imports, or the EU consumer might shift their buying to the products manufactured in the EU due to lower costs and higher chances of selling than products imported from Thailand.

Moreover, the CBAM regulation will indirectly restrict the imports which are not produced in an environmentally friendly way (Climate change news, 2023. These less environmentally friendly industries will move their production to countries with less strict greenhouse gas emissions rules, including Thailand (Xiaobei et al., 2022).

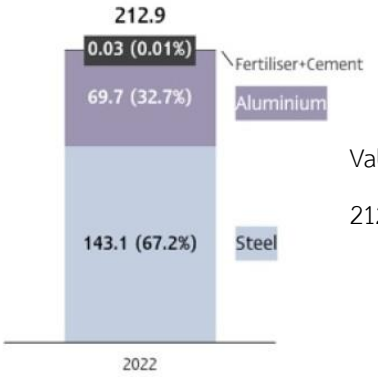
Regarding Thailand, Europe Union is not the single main export market for Thailand. The CBAM exports to Europe account for about 5% of Thailand's total export value (Treasury, 2023).

Thailand's primary exports to the EU include iron and steel, followed by aluminum. It is anticipated that CBAM will have a slight impact on the exportation of Thai products. The analysis of the impact of the CBAM on Thailand's industry is as follows:

4.1 The impacts of the CBAM on Thailand's industry (Macro-level impact) Although during the transitional phase of CBAM starting from October 2023, importers will have to submit a CBAM report on the emissions embedded in their imports without 'financial adjustment' through CBAM certificate purchasing (Bhatia, 2023). This will definitely increase costs for Thai manufacturers and exporters. This will cause higher costs for Thailand manufacturers and exporters as the expense for calculating the greenhouse gas emissions as well as processing paperwork. Besides, in the longer period, these costs will have a wider impact, especially in the case that Thai operators do not adjust their production processes or business operations to become more in line with a global standard. Overall, the impact of CBAM on Thailand's industry may be summarized as follows.

4.2 Negative Impacts of CBAM Higher costs of exports. Since the CBAM regulation will impose the price that importers will be required to pay additional fee for the emissions embedded in their goods, so the importers tend to put this extra cost burden on producers and exports trading partners. Therefore, costs of exporting goods to the EU or USA will be higher. These include direct costs calculated from greenhouse gas emissions, and indirect costs for measuring and reporting emissions, including other relevant paperwork.

Nevertheless, in a short period, CBAM has only a limited impact on Thailand industry since the products covered by the CBAM regulation exported to the EU accounted for 2.1% of total exports to the EU, and 0.17% of total global exports. Thailand's major goods exports to the EU include: iron and steel (1.5%) and aluminum (0.4%), whereas the export of other CBAM goods is limited or non-existent. Moreover, the exports of CBAM products from Thailand to the EU account for 5.3% of global export. This implies that the EU is not the major export market for these products. Thus, Thailand position is different from the UK, Serbia and Mozambique whose exporters most reliant on the EU (Onstad, 2023). The exports of CBAM goods from Thailand to EU is shown in Figure 3.



Value of CBAM products exported to EU27 was at 212.87 million US dollars.

Figure 3 Exports of CBAM goods from Thailand to EU (Puangsuwan , 2020)

Decrease EU competitiveness/Competitive disadvantage. Although Thailand proportion of CBAM exports to the EU is small, the export value of these goods, especially iron, steel, aluminum, and downstream products has expanded consistently over the past decades (Kossoy & Peszko, 2023). This leads to a vital question if Thailand can maintain this strong expansion or lose its market share to other competitors. As some countries like South Korea, China, and India have the same export structure as Thailand, these countries may be more well-prepared to meet the challenges of CBAM implementation than Thailand.

4.3 Positive impacts of CBAM Although CBAM tends to be a significant challenge and have negative impacts on many export companies, there are some positive effects on Thailand business and industry. CBAM creates an opportunity for Thailand to move towards a net-zero GHG emissions by 2065. main positive impacts of CBAM on Thailand are as follows.

4.3.1 Accelerating the transition to a low-carbon economy. Thailand has pledged to be carbon neutral by 2050 and reach net-zero greenhouse gas emissions by 2065 (TGO, 2016). However, the EU has set a target of achieving net-zero greenhouse gas emissions by 2050, or 15 years earlier than Thailand. Therefore, Thailand must readjust its national strategies and regulations to speed up industrial decarbonization process to keep pace with international community. So, all stakeholders in industrial supply chain must adjust their business operation because both direct and indirect emissions will fall within the scope of CBAM.

4.3.2 Greener trade and investment opportunities. At present, international trade tends to concern so much about environmental issues that implementation of environmental regulations can act as nontariff trade barriers (Non-tariff barriers: NTBs). However, if Thailand can make prior adjustments to enhance competitiveness over exporters from other countries, business operators will have opportunities to expand their markets share in the EU, and in other countries that are

likely to be enforced by the CBAM in the future (Sukhampha, 2022). In addition, under CBAM regulation, importers are required to report total greenhouse gas (GHG) emissions embedded in goods imported, and surrender the CBAM certificates verified by an accredited verifier. This could be turned into a new business opportunity such as GHG verification services, sustainability consultancy firm, as well as business involved in greenhouse gas emissions reduction like carbon capture storage advisory and development services, including green technology innovations.

4.4. Impacts on Thailand's industry

It's clear that the degree of CBAM impacts varies, depending on various factors such as export volume, the EU's trade dependency, supply chain, or activities fuels that generate greenhouse gas emissions. A comparative analysis of CBAM impacts on target sectors is presented below:

The iron and steel sector (including downstream iron products) will be the most affected by CBAM since Thailand exports most of iron and steel to the EU, and the EU is regard as major export markets for Thai steel when compared to other CBAM goods. The exports of iron and steel to the EU is 6.3% of total exports (Yusuf,& Resosudarmo, 2015). Moreover, the iron and steel sectors are the second most energy-intensive industry after plastic and aluminum sector. Nevertheless, CBAM may not have a serious impact on aluminum sector as exports of aluminum to the EU is less than iron products, but it emits more greenhouse gas and unit costs may will be higher.

However, aluminum sector is less integrated with other industries than is the iron and steel industry. Examination of the forward and backward linkage indices shows that CBAM implementation will have less impacts on upstream and downstream supply chain of aluminum sector than that of the iron sector. As for other targeted sectors of CBAM, it is expected that those products will be slightly affected since some products such as cement and fertilizer are exported to the EU in small volume, or no exports electricity and hydrogen to the EU at all (Kossoy & Peszko, 2023).

There is concern about Thai industry if the EU extends the scope of goods covered by CBAM by including chemicals and plastic (polymers) which once proposed by European parliament but was later rejected. Thailand's exports of plastic and polymer products are larger than iron and steel products. Plastics and polymers emit a high amount of greenhouse gases throughout their lifecycle. These sectors must prepare for future impacts if the commission further expands the scope of covered goods under the CBAM.

5. Thailand Preparation for Carbon Border Adjustment Mechanism (CBAM)

Thailand has implemented measures to promote and manage carbon footprint of products in order that stakeholders will get ready to report carbon emissions for products in the CBAM's targeted industries exported to the EU. Embedded carbon emissions will be measured by using carbon footprint tool. Thailand Greenhouse Gas Management Organization (Public Organization) has launched the Carbon Reduction Label showing the reduction of greenhouse gas emissions emitted from the production process of each product and service. There are three types of carbon label in Thailand which are:

5.1 Carbon Footprint of Product (CFP) is a label indicating the amount of greenhouse gases emitted throughout the life cycle of a product, starting from the procurement of raw materials, the production process, distribution, utilization, and waste management after its use. It shows their concern on the environmental impact of their products. Thailand Greenhouse Gas Management Organization (Public Organization) has developed a carbon footprint of product Project to allow consumers to obtain reliable information about GHG emissions of each product and make informed decisions. This increase competitiveness of Thai industry in international markets. At present, carbon labeling scheme has been applied in many countries such as United Kingdom, France, Switzerland, Canada, Japan and South Korea. Labeling is required for goods imported from Thailand as well (TGO, 2023). As shown in Figure 4.

Figure 4 Carbon Footprint of Product Label

5.2 Carbon Footprint Reduction or CFR is a label informing that such products pass carbon footprint criteria and demonstrated an achievement in reduction of the product's carbon footprint as required by the TGO's Carbon Labeling Program. Comparison of the product's Carbon Footprint between the present year and the base year is conducted in order to determine and

evaluate the reduced carbon footprint of the product against the TGO's requirement (TGO, 2023). as shown in Figure 5.

Figure 5 Carbon Footprint Reduction Label

5.3 Carbon Footprint of Circular Economy Product or CE-CFP label informs consumers that a product is produced by using renewable resources in accordance with the Circular Economy principles and emits less greenhouse gases than the same product made from virgin material (TGO, 2023). as shown in Figure 6.

Figure 6 Carbon Footprint of Circular Economy Product Label

The voluntary carbon market is a decentralized market driven by voluntary, private initiatives and not regulated by governments. Participants in the market may have targets of voluntary cap-and-trade for GHG emissions reduction with non-legally binding target and conduct buying or selling the carbon credits and GHG emission allowances for offsetting their emissions (TGO, 2023).

If Thailand implements the project and effectively collects data on greenhouse gas emissions reduction, this will support more power in negotiation at international conferences to propose solution to global warming.

6. What Thai exporters need to know about CBAM

EU Business Partners cooperation with trading partners in EU to know about enforcement measures, calculation method, and carbon tariff to prepare before the implementation.

UN Agencies & Others. Engagement and collaboration with international organization to show that Thailand has high levels of potential as well as international standards of operations management.

Climate Follow-up. Follow up situations in countries that tend to developments other related jurisdictions which will be enforced in the future.

Climate Trialogue. Participation with agency or association that play important roles in negotiating related principles.

Importers or manufacturers (Thai importers) of CBAM goods need to be authorized to import CBAM products. Only authorized CBAM declarants may import goods into the EU.

Importers or exporters of CBAM goods would be required to purchase the CBAM certificates, as well as provide reports on embedded GHG emissions and annual CBAM declarations. The emissions embedded will be calculated as national carbon price. (At present, Thailand has not yet registered in embedded emissions system, Thai operators, instead, have applied carbon footprint label to indicate participation in reducing greenhouse gas emissions.

Importers of the covered goods and products will require CBAM certificate as evidence of the carbon price paid in the country of production, the prices of which will correspond to the volume of greenhouse gases emitted during production. If no CBAM certificate is submitted, the declarant will have to pay a penalty equivalent for which it has not surrendered CBAM certificates, to be increased in line with consumer prices.

A transitional phase will run from 1 October 2023 until 31 December 2025, during which only emissions reporting is required without 'financial adjustment' through certificate purchasing. From 2026 the CBAM will be fully implemented. So, traders should forecast future expenses that will increase due to the CBAM implementation.

The full scope of the CBAM regulation will enter into force on 1 January 2026. From that moment on importers will need to purchase and surrender CBAM certificates to cover the declared emissions (ICAP, 2023).

Furthermore, Thailand's export sector should closely monitor any developments concerning CBAM enforcement to prepare and reduce its possible impact in the future, including improve their manufacturing operations to make the production of goods more environmentally friendly, and use renewable energy sources to reduce greenhouse gas emissions. These will enhance their competitiveness in the EU market and support sustainability for more sustainable future.

7. Summary

The European Union's Carbon Border Adjustment Mechanism (CBAM) may have direct impact on Thailand as an original equipment manufacturer that is highly dependent on exports. It is estimated that total value of CBAM products exported from Thailand to the EU was 952 million USD (TGO, 2023). A rise in the prices of these exported goods due to a higher tax rate could harm competitiveness in global market, or those products cannot be imported into the EU.

All in all, apart from dependence on exporting to the EU, other factors also play important roles in exacerbating the impacts of CBAM whether the intensity of carbon emissions during manufacturing process, power of the importers in transferring costs of management to the exporters and import substitution or export promotion. However, cost of CBAM may decrease if the export country imposes domestic carbon price and implements appropriate carbon emissions reduction measures.

Looking ahead to the future, EU is the first global actor to adopt CBAM, this stimulates countries worldwide to consider other carbon tax measures too. The US Congress has proposed Clean Competition Act (CCA) whereas the UK government is consulting on a range of potential policy measures to mitigate future carbon leakage risk such as CBAM and Mandatory Product Standards (MPS) to help the environment and reduce carbon footprint (The World Bank, 2023). In addition, Canada has signaled its interest in the CBAM, and officially discussed a CBAM-related agreement with the EU.

Once CBAM comes into force, production sector and international trade must adjust their strategies. Any country whose manufacturing industry brings about the consumption of resources and the destruction of the environment will need to look at ways to reduce their product carbon intensity to enhance competitiveness by improving energy efficiency, burning lower-carbon fuels, and optimizing production processes.

Although, over the short term, the impact may seem limited, in the long term, the effect the CBAM and CBAM-like regulations in other jurisdictions will inevitably have significant impacts on Thai exporters and producers. Moreover, Thailand greenhouse gas emissions between 2016-2019 have significantly increased. This will increase costs of production as CBAM requires importers to pay the cost of emissions corresponding to carbon footprint of the imported products, based on the EU ETS price. Greenhouse gas emissions from industrial sector and Industrial Process and Product Use (IPPU) accounted 10% of total greenhouse gas emission of Thailand (Kesicki, 2011). Manufacturing and industrial processes that emit the largest amounts of greenhouse gas are and

mineral products and chemicals, specifically primary chemicals as ethylene will be also covered under CBAM. As a result, there is a risk that ethane exports costs will rise significantly in the future.

There are measures that businesses can take to prepare for the implementation of CBAM. These include understanding method used for calculating greenhouse gas emissions, investigating their own carbon emissions and planning to de-carbon their own supply chains such as improve production efficiency to maintain competitive advantages, install solar rooftop to increase the share of renewable energy, switch to electric vehicles, and implement efficient solid waste treatment and wastewater treatment to reduce the greenhouse gas emissions from waste

The US shouldn't fear the EU CBAM as the impact would be marginal and it could actually represent an opportunity for the US to become highly competitive in a market where other producers are required to pay a higher carbon tax based on the higher embodied carbon content of their products.

In Thailand, the Thailand Greenhouse Gas Management Organization (TGO) has developed the Thailand Voluntary Emission Trading System (Thailand V-ETS) to promote GHG reduction implementation under the domestic voluntary carbon market. Recently, Thailand launched its first carbon credit exchange to achieve carbon neutrality by 2050 and combat climate change. The new carbon market called the FTIX is operated by the Federation of Thai Industries (FTI). A trading platform encourages private companies and government agencies to trade carbon credits and track their emissions on an online dashboard.

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