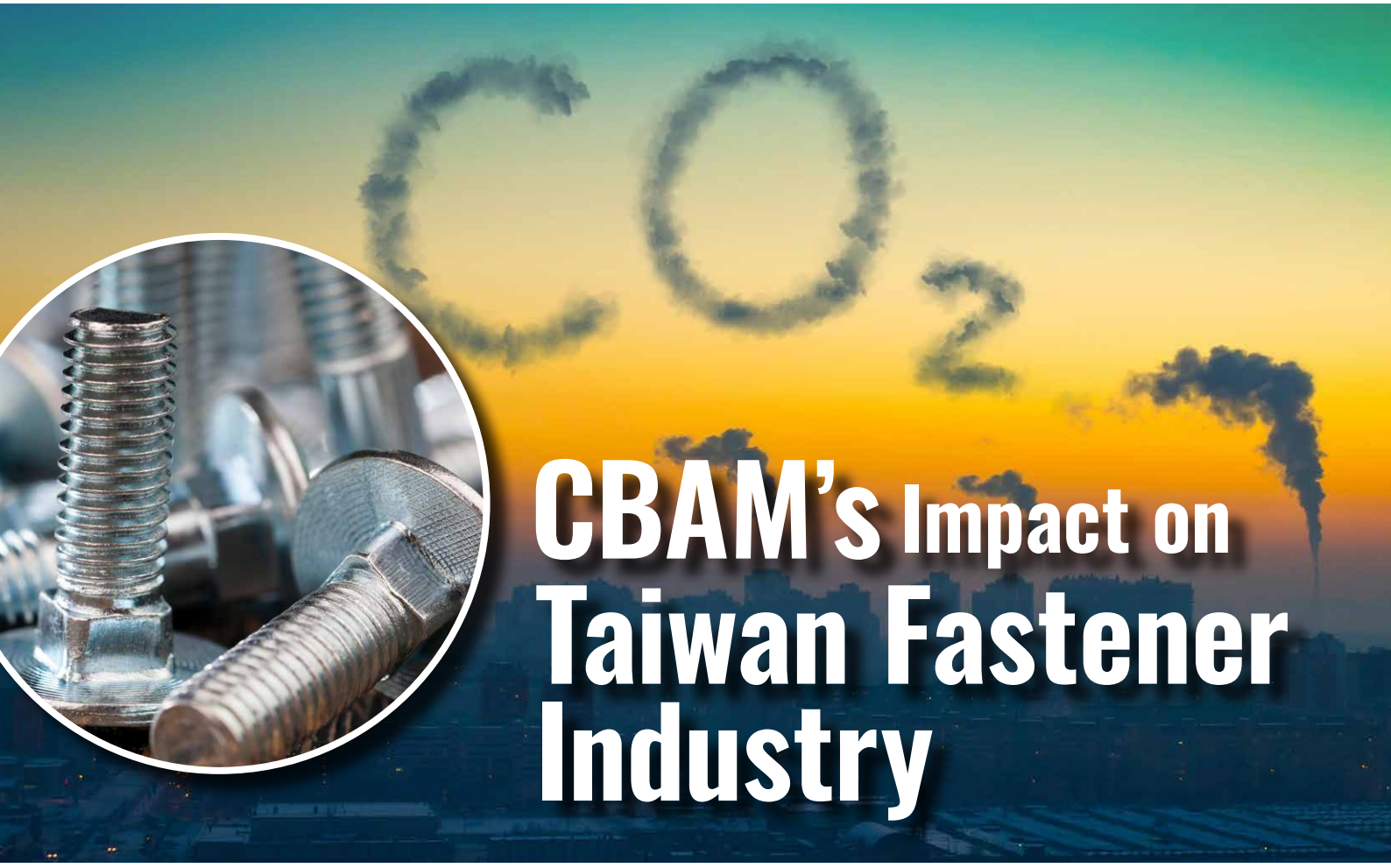

CBAM's Impact on Taiwan Fastener Industry

Foreword

The EU Carbon Border Adjustment Mechanism (CBAM), which is of international concern, was proposed in 2021, and was jointly examined by the EU Parliament and the Council, and a provisional agreement was reached in December 2022, which will expand the products covered by the EU CBAM from steel, cement, aluminum, fertilizer and electricity, as originally proposed by the EU Executive Committee, to hydrogen, specific precursors, some indirect emissions and downstream products (including steel products such as fasteners). The agreement is expected to be implemented on a trial basis in October 2023 and to be officially launched in 2026.

The screws and fasteners added to the version after the EU tripartite talks in December 2022 are mainly tariff code number 7318 (steel screws, bolts, nuts, rivets, washers and similar products), which directly affects the export-oriented Taiwan fastener industry. Although Taiwan's main export destination is the U.S., the EU market cannot be ignored. For example, the U.S. has set a target of reducing carbon emissions by 40% by 2030, and U.S. President Biden signed the Clean Competition Act (CCA), and the metal industries to be levied starting in 2024 include steel, aluminum and other products; and in 2027, the EU will formally impose direct carbon emission fees on fastener importers, and Taiwan ranks as the fourth largest fastener import origins for the EU. If Taiwan fastener industry does not properly react to the carbon emission issue in Europe and the U.S., China and other competing countries may increase their market share in the EU in the future.

Analysis of Taiwan Fastener Trade with the World and EU Countries

(1) Taiwan's Fastener Export to the World and EU

Taiwan is one of the major fastener producing countries in the world and has a key position in the international supply chain. In 2022, Taiwan's exports of various types of metal fasteners (including steel, copper, aluminum and other types of fasteners) amounted to NT$189.55 billion, of which exports to the EU amounted to NT$49.55 billion, with EU exports accounting for 26.1% and a compound growth rate of -2.1% in the past five years. If we take steel fasteners (tariff number: 7318) to be included in the CBAM list as the statistical scope, the export value of Taiwan's steel fasteners in 2022 was about NT$181.06 billion, of which about NT$48.55 billion was exported to the EU, with the EU's export share of 26.8% and the compound growth rate of -2.1% in the past five years, mainly for automotive, machinery, construction and industrial fasteners. Although the compound growth rate of exports to the EU has been on a downward trend in recent years, the overall share still shows that the EU is an important fastener export market for Taiwan (see **Table 1**).

Table 1. Taiwan's Fastener Exports to the World and EU in 2018-2022

Unit: NT$ 0.1 bn;%

	2018	2019	2020	2021	2022	CAGR
Value of Taiwan's Fastening Product Export to the World	1,504.8	1,401.3	1,290.2	1,726.7	1,895.5	5.9%
Value of Taiwan's Fastening Product Export to the EU	428.6	377.7	330.5	457.6	495.5	3.7%
% of EU in Taiwan's Global Fastening Product Export	28.5%	27.0%	25.6%	26.5%	26.1%	-2.1%
Value of Taiwan's Fastener (HS Code 7318) Export to the World	1397.0	1333.2	1171.5	1487.0	1810.6	6.7%
Value of Taiwan's Fastener (HS Code 7318) Export to the EU	408.0	368.1	305.7	399.9	485.5	4.4%
% of EU in Taiwan's Global Fastener (HS Code 7318) Export	29.2%	27.6%	26.1%	26.9%	26.8%	-2.1%

Source: Taiwan Customs / compiled by MIRDC

(2) Analysis of EU's Major Steel Fastener (HS Code 7318) Import Origins, Values, and Weights in 2021

Table 2 shows EU's main import origins, values and weights of steel fasteners (tariff code: 7318) in 2021. In terms of value, Germany was the top import origin for the EU, with an import value of NT$129.98 billion, accounting for 26.5%, while China was the second largest import origin, with an import value of NT$63.66 billion, accounting for 13.0%; in terms of weight, China was the top import origin for the EU, with an import weight of 872,000 tons, accounting for about 20.1%, while Germany was the second largest import origin for the EU, with an import weight of 835,000 tons, accounting for 19.2%. In addition, Taiwan was the fourth largest import origin for the EU, with an import value of NT$43.72 billion, accounting for 8.9% of the total. Among the top 10 import origins, only China and Taiwan are Asian countries, while the rest are EU countries. Therefore, the challenge for Taiwan fasteners in the EU market is that there are eight EU countries with geographical advantages and China good at snatching the market with its economic scale. If Taiwan manufacturers ignore this development in the EU in the future, it may allow other competing countries to take the lead and undermine the performance of Taiwan's fastener industry exports to the EU market.

Table 2. EU's Major Steel Fastener (HS Code 7318) Import Origins, Values, and Volumes in 2021

Unit: N$0.1 bn; 10,000 tons; %

Ranking	Major Import Origin	Value	Volume	% in EU's Total Value	% in EU's Total Volume	% in Top 10 Origins' Value	% in Top 10 Origins' Volume
1	Germany	1,299.8	83.5	26.5%	19.2%	33.0%	23.5%
2	China	636.6	87.2	13.0%	20.1%	16.1%	24.5%
3	Italy	489.3	39.8	10.0%	9.2%	12.4%	11.2%
4	Taiwan	437.2	43.5	8.9%	10.0%	11.1%	12.2%
5	The Netherlands	229.1	23	4.7%	5.3%	5.8%	6.5%
6	France	223	38.1	4.5%	8.8%	5.7%	10.7%
7	Poland	169	16	3.4%	3.7%	4.3%	4.5%
8	Czech Rep.	158.6	12.9	3.2%	3.0%	4.0%	3.6%
9	Austria	153.9	8.9	3.1%	2.0%	3.9%	2.5%
10	Switzerland	146.2	2.9	3.0%	0.7%	3.7%	0.8%
EU's Import from Top 10 Origins		3,942.7	355.8	80.4%	81.8%	100.0%	100.0%
EU's Import from the World		4903.3	434.8	100.0%	100.0%	--	--

Source: ITC/ compiled by MIRDC

(3) Taiwan's Major Steel Fastener Export Destinations and Values

Table 3 shows Taiwan's major steel fastener (tariff code: 7318) export destinations and values in 2018-2022. The U.S. was the major export destination of Taiwan steel fasteners, with an export value of NT$82.3 billion, accounting for 43.4% and a compound growth rate of 11.3% in the past five years. Among the top 10 export destinations, 4 are EU countries, including Germany, the Netherlands, Sweden, Italy. The combined export value to these four EU countries reached NT$33.17 billion, and their export share also reached 17.5%; among the top 20 export destinations, 10 are EU countries, including France, Spain, Poland, Slovakia, Belgium, Denmark, etc. The combined export value to these 10 EU countries reached NT$51.66 billion, and their export share was 27.3%. Therefore, the implementation of CBAM has a great impact on Taiwan fastener industry.

Table 3. Taiwan's Major Steel Fastener (HS Code 7318) Export Destinations and Values in 2018-2022

Unit: NT$ 0.1 bn;%

Ranking	Major Export Destinations	2018	2019	2020	2021	2022	% in Taiwan's Total Export	CAGR
1	USA	535.9	541.6	498.8	629.8	823.0	43.4%	11.3%
2	Germany	136.4	121.2	100.6	127.4	153.3	8.1%	3.0%
3	The Netherlands	78.7	70.2	57.6	81.7	99.5	5.2%	6.0%
4	Japan	69.5	74.5	62.0	68.7	85.4	4.5%	5.3%
5	UK	53.8	53.0	40.4	58.6	62.1	3.3%	3.7%
6	Canada	49.1	44.9	38.1	49.6	57.9	3.1%	4.2%
7	China	42.7	34.7	37.4	52.1	49.5	2.6%	3.8%
8	Mexico	28.7	30.1	23.0	33.5	40.9	2.2%	9.3%
9	Sweden	29.7	29.2	25.2	34.1	40.2	2.1%	7.8%
10	Italy	31.7	25.4	21.0	29.1	38.7	2.0%	5.1%

Source: Taiwan Customs / compiled by MIRDC

How will EU CBAM be Implemented?

The gas emissions covered by the EU CBAM need to be consistent with the EU Emission Trading Scheme (European Union Emission Trading Scheme, EUETS), meaning greenhouse gases (CO2, N2O, PFCs) will be regulated and require payment to obtain emission rights, and the price of which is determined by the EUETS under the Cap and Trade mechanism. The price is determined by the EU ETS under the Cap and Trade mechanism. According to CBAM, the embedded emissions of manufacturing include direct emissions and indirect emissions.

Implementation Schedules of CBAM

The implementation of CBAM can be divided into three phases: transition period, partial implementation, and full implementation. The free allowance permit of EUETS will be phased out gradually.

1. Phase 1 (October 2023-2025): EU CBAM requires EU importers to purchase CBAM certificates corresponding to the carbon price they should pay.

2. Phase 2 (2026-2033): CBAM will be formally implemented in 2026. In the beginning it will be in line with the EU ETS standards, with some emissions entitled to free emission credits, and decreasing year by year.

3. After 2034: Free emission credits will be fully replaced by CBAM. EU importers will be required to purchase CBAM certificates from member countries and keep them in their accounts, and the certificates will be set according to the average weekly closing price of EU-ETS.

(2) Value Setting of Carbon Content of Products

If the operator is unable to provide the actual and verified emission value of the product's production stage, the EU will use the third country or third-party unit data as the default value, and if the product emission value of the exporting country cannot be established through reliable data, the EU will use the 10% average emission concentration of the worst performance of the equipment producing such products in the EU as the default value.

(3) Calculation of Greenhouse Gas Emissions, Carbon Tariffs, and Carbon Content

1. GHG emissions calculation: Emissions = Activity data × GHG emission coefficient × Global Warming Potential (GWP) value

2. Carbon tariff calculation: Carbon tariff = carbon content of a product × carbon price

3. Carbon content calculation: the simple calculation of carbon content is "embedded emissions of manufacturing (direct and indirect emissions)" divided by "the number of products produced", while the complex calculation of carbon content is "embedded emissions of manufacturing (direct and indirect emissions) plus embedded emissions of materials used" divided by "the number of products produced."

(4) Carbon Inventory, Carbon Footprint, and Third-Party Certification

Although manufacturing processes of various types of screws are different, they can be generally categorized into wire processing, forming, heat treatment, surface treatment, delivery, etc. If we differentiate the carbon content of fasteners by raw materials and manufacturing process, raw materials (like steel) account for about 30% of the carbon content, manufacturing processes account for about 70-80%, whose emissions are mainly from electricity (indirect emission) and heat treatment is the main carbon emission source for fastener processes.

1. **Carbon Inventory (ISO 14064-1)**: Calculate the total annual carbon emissions of a single organization, and add up all the carbon emissions of the annual production and manufacturing within the inventory boundary. At present, Taiwan fastener manufacturers tend to apply for ISO 14064 carbon organization emission certification as a proof of carbon reduction.

2. **Carbon footprint (ISO 14067)**: Calculate the total carbon emissions of a single/series product life cycle, including the total carbon emissions of a single/series product at each stage from the manufacturing of raw materials to the disposal of the product.

3. Third party certification: in accordance with international standards and norms to verify the credibility. The declarations issued by the third party are valid with public credibility.

Taiwan Fastener Industry's Response to CBAM

(1) Taiwan Fastener Companies

i. Understand the international standards and information of the proposed convergence, such as: the calculation method of carbon content of products, carbon content boundary recognition criteria, carbon emission monitoring mechanism.

ii. Establish carbon inventory and carbon emission source identification mechanisms for the whole fastener supply chain.

a. Upstream (other indirect emissions): Emissions from raw materials (manufacturing emissions of coils and steel, other materials such as heat treatment and electroplating processes), upstream transportation and distribution (indirect emissions from outsourced manufacturing).

b. Midstream (in-plant emissions are the part mainly affected by CBAM): direct emissions (including heading, threading, heat treatment, mobile emissions from forklifts or trucks, wood spirit and propane emissions from heat treatment, organic solvents for coating and electroplating, etc.); indirect emissions (including purchased power emissions and purchased steam emissions from manufacturing); at present, except for a few large Taiwan fastener factories, which are one-stop manufacturing plants. At present, except for a few large factories having their own one-stop manufacturing process, other factories mostly outsource the heat and surface treatments which consume more energy.

c. Downstream (other indirect emissions): emissions from end products (transportation and distribution of shipments, end customers' use of fastener products, and product waste disposal).

iii. Understand their own current situation to set carbon reduction solutions:

a. Production line data integration into the carbon traceability management platform: the introduction of product carbon content capturing and calculation mechanism to understand and collect the current status of carbon emissions, combine the product carbon footprint information with ERP work orders and build on the metal carbon emissions cloud platform.

b. Intelligent manufacturing into low carbon technology and management process improvement and optimization: diagnose the production process with high carbon emission, build carbon emission platform and import into the process (real-time energy consumption data acquisition, carbon emission traceability and visualization of the whole factory, controller presenting real-time machine status, expansion of new product process carbon emission inspection), etc.

c. Introduction of energy-saving combustion system technologies: including thermal storage combustion technology (saving energy by 30~40%) and self-preheating combustion technology (saving energy by 15~20%).

iv. Obtain internationally recognized verification data: Taiwan's carbon fee or total volume control and foreign emission reduction credits are mutually certified to obtain internationally recognized carbon footprint/emission data verification.

v. Domestic fastener manufacturers strive to join relevant international initiatives: After foreign countries initiate carbon emission limitation policies and levy carbon tariffs, major manufacturing and brand manufacturers can evaluate joining international initiatives related to carbon emissions, such as the Science Based Targets Initiative (SBTi) and RE100 led by the Carbon Disclosure Project (CDP) and The Climate Group. If Taiwan fastener manufacturers can join, it can enhance the advantages of Taiwan fastener manufacturers to be included in the evaluation of fastener products purchased by the EU.

(2) Taiwan Government and Related Units

i. Assist the fastener industry to establish a carbon inventory mechanism in conjunction with the supply chain: Adopt the method of assisting small factories by large factories with more mature carbon inventory energy, analyze the energy of carbon reduction hotspots, match experts to introduce technology to reduce carbon, and simultaneously introduce digitization and report the carbon content of products in accordance with the EU CBAM to systematically construct the carbon reduction capacity of the industry chain.

ii. Assist in the establishment of third-party verification system and promote the unification of carbon content calculation mechanism in Taiwan and Europe: In accordance with international standards, assist in the establishment of third-party verification units to obtain EU-approved and credible declarations; in addition, also compare the carbon emission intensity (pounds of carbon dioxide/total square feet) of fastener products in Taiwan and Europe, and promote the unification of carbon content calculation mechanism of fastener products in Taiwan and Europe.

iii. Assist the domestic fastener supply chain in carbon reduction technology: In addition to major fastener manufacturers, it can be also extended to satellite factories around major manufacturers to assist the industry in constructing carbon reduction smart manufacturing technology.

iv. Continue to assist the fastener industry in high value, carbon reduction, and talent training and cultivation, and hold CBAM-related briefing sessions in conjunction with industry, government, academia, and research sectors to help the industry understand the CBAM mechanism norms and reporting procedures.

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