

The impact of EU's "carbon tariff" policy on the development of China's aluminum industry and its response

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Abstract. In order to cope with the impact of carbon emissions on global climate change, the Council of the European Union adopted the Carbon Border Adjustment Mechanism (CBAM, hereinafter referred to as "carbon tariff") on March 15, 2022, which will have a profound impact on the international aluminum trade and the low-carbon development of the aluminum industry. As one of the largest aluminum producers in the world, China's aluminum industry inevitably needs to cope with the challenges brought by carbon tariff policy. Therefore, this paper is devoted to studying the impact of the EU's "carbon tariff" policy on China's aluminum industry, and formulating corresponding countermeasures to ensure the competitiveness and sustainable development of China's aluminum industry.

Keywords: carbon border adjustment mechanism; Carbon tariff; exports of aluminum products; aluminum industry.

1. Introduction

"Carbon tariff" is a tax or adjustment mechanism for imported or exported high-carbon products, which is mainly implemented in countries or regions that implement strict carbon emission reduction policies. Its core goal is to avoid carbon leakage caused by the transfer of high-carbon industries from countries with strict carbon reduction policies to countries with loose policies, so as to better achieve low-carbon climate goals. In addition, the implementation of carbon tariffs can also help promote green transformation and low-carbon economic development worldwide. By imposing a carbon tax on foreign imports, it can encourage enterprises to improve energy efficiency and reduce carbon emissions, thus promoting global green technology innovation and industrial structure optimization. Eu imposes "carbon tariff" on imported goods, which provides certain incentive and protection policies for local companies by raising the threshold and cost of EU imported products, thus effectively ensuring the market competitiveness of local similar products, which is conducive to the steady development of local economy (Fu Guoyan, Chen Xiaoli, 204:242-243)^[1].

2. The origin and progress of the EU's "carbon tariff" policy

In July 2021, the European Commission for the first time published the detailed proposal on the "carbon tariff", which clearly stated that it was ready to implement the carbon Border Adjustment Mechanism (CBAM) starting from January 1, 2023, mainly covering five areas in the European market: electricity, steel, cement, aluminum and fertilizer. The policy will officially enter a three-year transition phase (from 2023 to 2025) on October 1, 2023. During this period, products will only have to report their carbon emissions and the EU will not charge them any fees. After the implementation of the EU ETS in 2026, the proportion of free carbon allowances for covered industries will be reduced by 10% year by year. By 2034, the free allowances will be completely abolished, and the free allowances of the EU ETS will be gradually replaced by CBAM (Shang Shijin, Zhu Zhongren, Dong Jianrui et al., 2024: 116)^[2], which means that products imported into the EU will need to pay a corresponding carbon fee according to the carbon emissions in their production process.

On March 15, 2022, at the Economic and Financial Affairs Committee (ECOFIN) meeting of the Council of the European Union, the finance ministers of the 27 EU countries adopted the proposal of the French Presidency of the Council of the European Union for a carbon border adjustment

mechanism. This means that the European countries support the adoption of the carbon Border adjustment mechanism, and the relevant issues are expected to be reviewed and the details are determined in July 2022 (Zhang Liangliang, Tan Xianshi, Han Zhanmeng et al., 202:9)^[3].

After the EU Carbon Border Adjustment Mechanism (CBAM) officially started its transition period on October 1, 2023, the carbon emissions of steel, aluminum, cement and fertilizer imported to the EU will be reported to the EU. After the end of the transition period, imported goods need to purchase the corresponding number of CBAM certificates (Xing Li, Fan Yixia, Li Mojie, 2023:26)^[4]. It can be seen that the implementation of the "carbon tariff" policy in the future will bring major challenges to the aluminum industry with high greenhouse gas emissions.

3. International trade of aluminum products and China's export of aluminum products to EU

According to the statistics of the World Metal Statistics Bureau (WBMS), the global bauxite trade volume showed a fluctuating upward trend from 2005 to 2020. In 2005, the global bauxite export volume was 24.0457 million tons, and in 2020, the global bauxite export volume has reached 65.8720 million tons, with a compound annual growth rate of 6.95% from 2005 to 2020. In 2017, the market share of the top ten global bauxite enterprises reached 50.67%, showing a high degree of industry concentration, which can be said to occupy half of the bauxite supply, among which the output of Chinalco ranks fifth, indicating that China has an important position in the global bauxite mining field, and the importance of the international supply of aluminum products should not be underestimated. In terms of trade volume, the global import and export trade volume of aluminum commodities in 2021 has reached 231.697 billion US dollars and 238.722 billion US dollars respectively, accounting for about 1.1% of the total import and export trade volume of all commodities in the world (Feng Weiran, Yuan Yuan, 2023:20)^[5]. This once again shows the necessity of effectively responding to the EU's "carbon tariff" on the international trade of aluminum products.

According to Chinese customs data, China will export 689,000 tons of aluminum products to the EU in 2023, down 30% year on year, accounting for 8.7% of the total global export of the corresponding products. The total export volume was 22.76 billion yuan, down 26 percent year on year, accounting for 10.3 percent of the total global export of the corresponding products. This shows that China's overall export of aluminum products to the EU showed a downward trend, probably because the market competition of aluminum products in the EU is relatively fierce. Besides China, other countries are also actively participating in the market, and factors such as the improvement of product quality and the enhancement of price competitiveness are likely to lead to the reduction of China's export share. In addition, such as trade policy, exchange rate fluctuations and other external environment will inevitably lead to a decline in China's export volume to the EU. In terms of export countries, China will export aluminum products to all 27 EU countries in 2023. Among them, the top five export destinations are Germany, Italy, France, Poland and the Netherlands, with export volumes of 115,000 tons, 81,000 tons, 81,000 tons, 77,000 tons and 77,000 tons respectively, accounting for 16.7%, 11.8%, 11.8%, 11.2% and 11.2% of the total export to the EU, accounting for 62.7% of the total. High degree of concentration. Among them, Germany, as a European economic power and an established country with developed manufacturing industry, is one of the main markets for China's aluminum products export. In addition, China's export products to the top five export destinations of Germany, Italy, France, Poland and the Netherlands are also relatively concentrated, with the export volume of aluminum plate and belt, aluminum structure and other aluminum products accounting for 68%, 67%, 90%, 68% and 67% of the total export volume of aluminum products to each country respectively. This is related to the demand of these products in the EU market. These countries have a large demand for these three types of aluminum products, so they import a large amount of Chinese aluminum products.

4. The impact of EU's "carbon tariff" policy on domestic and foreign trade of aluminum products

The implementation of the EU "carbon tariff" policy will inevitably have a significant impact on the global aluminum industry. The following will analyze the impact of this policy on China's aluminum trade from three aspects: export cost, enterprise transformation and supply and demand pattern.

4.1. Rising export cost of aluminum products

Some professional organizations predict that after the implementation of the EU act, the cost of Chinese enterprises exporting to the EU will increase by 6%-8% (Yuan Chunmei, 2023:5)^[6]. According to statistics, the total carbon emission per ton of electrolytic aluminum with thermal power as energy is 12.22 tons of carbon dioxide equivalent (Guo Chaoxin, 202:139)^[7]. Under the EU's "carbon tariff" policy, if the tax of 50 euros per ton of carbon dioxide is calculated, the carbon cost per ton of electrolytic aluminum with thermal power as energy will reach 611 euros. This will undoubtedly make high-emitting aluminum producers uncompetitive in terms of price, thus reducing exports to the EU. This may lead to a decline in China's competitiveness in the international market of the whole high-carbon emission industry, and these sectors are highly related to other industries in China, which will trigger a chain reaction in other domestic industries, and then have a great impact on

China's foreign trade (Ye, 2023:22)^[8]. Therefore, in the short term, the challenge of rising export costs of aluminum products will be met.

4.2. The share of low-carbon aluminum products in trade continues to increase

To cope with the pressure of rising export costs, enterprises will be more inclined to adopt low-carbon technologies and renewable energy to export low-carbon aluminum products. Norway's Hydro, for example, is already developing low-carbon aluminium products from renewable energy sources. Compared with traditional aluminum production powered by coal power, Hydro's production process emits only a quarter of the global average. This shows that the application of low carbon technology can not only reduce the production cost of aluminum products, but also improve the competitiveness of products in the international market, thus increasing the trade share of low carbon aluminum products. In the long run, the trade share of low-carbon aluminum products will continue to increase in the process of coping with the EU's "carbon tariff" to increase the export cost.

4.3. Reshape the supply and demand pattern of global aluminum products

From a global perspective, the carbon border adjustment mechanism may cause the trade imbalance of the global developing countries represented by China, which will also have a negative impact on the global trade market (Ye, 2023:22)^[8]. As the market share of some high-emission production enterprises declines, enterprises with low-carbon production capacity will gain more market opportunities. This may lead to a restructuring of the global aluminum industry chain and promote the industry's shift to regions with higher environmental standards. Producers such as Alcoa of Canada and Rusal, for example, may gain a greater advantage in the EU market because of their lower carbon footprint. At the same time, this policy may also stimulate the demand side of aluminum products, with consumers and downstream manufacturing industries more inclined to environmentally friendly and sustainable products and producers when selecting suppliers.

5. The impact of the EU's "carbon tariff" policy on the low-carbon development of China's aluminum industry

In the current global climate governance system, carbon tariff policy, as a market-oriented mechanism with dual functions of incentive and restraint, has a profound impact on international trade, especially on industries with high carbon emissions. However, with the implementation of

carbon tariff by the European Union on a global scale, the impact of carbon tariff policy not only stays at the level of commodity trade, but also deeply penetrates into the industrial development strategy and structural adjustment. In theory, carbon tariffs directly affect the price competitiveness of products in the international market by imposing marginal costs on products with high carbon footprint, which in turn prompts relevant industries in producing countries to consider how to maintain their market share by reducing carbon emissions. Specifically, the aluminum industry, as a traditional industry with high energy consumption and high emissions, has been particularly affected. The direct impact of the EU's "carbon tariff" policy on aluminum products is reflected in the increase of costs, which forces aluminum producers to find a new balance between costs and prices. The mechanism of transforming from trade effect to industrial development influence is embodied in the following aspects:

(1) The increase of cost has compressed the profit margin, and triggered the review of production efficiency and energy structure of aluminum manufacturers. To a certain extent, this can encourage enterprises to promote the innovation of energy conservation and emission reduction technology through cross-industry collaboration and international talent exchange, and explore low-carbon production technology and management methods, so as to reduce carbon emissions in the production process, thus reducing the cost burden caused by carbon tariffs. The development of new technologies and processes will improve the carbon efficiency of the aluminum industry. Meanwhile, market-oriented means will become an important driving force to promote the deep low-carbon transformation of the aluminum industry, providing power and direction for the low-carbon transformation of the industry. According to Tianfeng Futures data, if one ton of electrolytic aluminum may consume about 13,500 KWH of electricity, the carbon dioxide emissions of aluminum produced by thermal power generation can be as high as 13.5 tons, compared with only 2 tons for aluminum produced by hydropower, which highlights the potential of energy structure optimization.

(2) Facing the external cost pressure brought by carbon tariffs, enterprises must adjust their product mix, give priority to the development and promotion of low-carbon products, so as to meet the market demand for low-carbon aluminum. This forces the aluminum industry to pay more attention to carbon emission reduction. Aluminum industry enterprises will invest funds to improve production technology, increase the utilization rate of circular economy and clean energy, and focus on improving the low-carbon development level of the whole industry, so as to effectively cope with the increasing global green trade barriers. At the same time, the market will gradually tend to choose those aluminum products with a smaller carbon footprint, which is conducive to promoting the green transformation of the aluminum industry from the source. This structural adjustment is not only a response to the current trade policy, but also a prediction and adaptation to the future market trend. Under the dual influence of the EU's "carbon tariff" and the domestic "dual carbon" target, the aluminum product structure must be adjusted to ensure that the aluminum industry meets the energy efficiency while reducing the carbon footprint, so as to achieve a greener production mode. In the long run, this will help to form a new industrial development model with low carbon technology as the core competitiveness, and promote the transformation of the aluminum industry towards a more sustainable and environmentally friendly direction. Therefore, it can be predicted that the EU's "carbon tariff" policy will serve as a catalyst to accelerate the transformation of China's aluminum industry, promote industrial upgrading and technological innovation, and meet the requirements of sustainable development at home and abroad.

(3) The implementation of the carbon tariff policy will strengthen international cooperation and exchanges, form a global consensus on the development of low-carbon industries, promote the transnational flow of technology, capital and information, so as to optimize the allocation of resources at the global level and improve the overall low-carbon development level of the aluminum industry. In this process, advanced low-carbon technologies and their derivatives are expected to become new global economic growth points and bring new market opportunities for the development of the global aluminum industry.

6. Countermeasures and suggestions for the development of China's aluminum industry under the background of EU's "carbon tariff" policy

In the context of globalization, the issue of climate change has been paid more and more attention by the international community. The proposal of the EU "carbon tariff" policy is an important measure arising at the historic moment in this situation. For China's aluminum industry, this is not only a challenge, but also an opportunity to transform and upgrade and accelerate green development. As an industry with high energy consumption and carbon emissions, aluminum industry will inevitably be affected by the "carbon tariff" policy when its products are exported to the EU. In face of this situation, there are the following specific suggestions:

(1) Regarding the increase in export cost of aluminum products, it is suggested that domestic enterprises improve production efficiency and environmental protection standards to reduce carbon emissions. Specifically, enterprises can optimize production processes by introducing or researching and developing advanced low-carbon technologies and equipment to reduce energy consumption. From the national point of view, the government can encourage enterprises to upgrade and transform technology through financial subsidies, tax breaks and other policies. For those enterprises that have made outstanding contributions in energy conservation and emission reduction, certain research and development subsidies can be given to relieve their short-term economic pressure caused by technology investment.

(2) In view of the structural transformation of aluminum production enterprises, it is recommended that enterprises increase R&D investment and develop new aluminum materials and products. Enterprises need innovation-driven development to enhance the added value of products and open up new market demand. At the same time, the government needs to support enterprises to cooperate with universities and research institutions, promote the implementation of industry-university-research integration, jointly tackle key technologies, and accelerate the transformation of achievements.

(3) As for the impact on the global trade pattern, it is suggested that the country actively participate in international cooperation and dialogue, promote the construction of a fair and reasonable international trade system, and make the aluminum industry of both sides interact positively. At the same time, aluminum enterprises need to actively cultivate domestic and foreign aluminum industry markets, explore diversified foreign trade markets, and reduce dependence on a single market.

In general, under the pressure of EU "carbon tariff", it is hoped that Chinese aluminum processing enterprises can change the existing passive situation through a series of measures, turn challenges into development opportunities, so as to consolidate and enhance their position in the global industrial chain, and enhance international competitiveness in the global economic integration.

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