ISSN:2790-1688 DOI: 10.56028/aetr.3.1.364

Research on International Mutual Recognition of Carbon Certification System of Automobile Products

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Abstract: With the global attention to climate change gradually heating up, to carbon peak carbon neutralization as the theme of the new international trade system is gradually taking shape, will also have a broad and far-reaching impact on our foreign trade pattern. The automobile industry is the key to transportation in our country carbon industry, in response to climate change under the situation of double carbon targets, for car carbon product certification international mutual recognition research is not only beneficial to China's auto industry to establish a comprehensive carbon accounting system but can also help our country automobile industry breakthrough carbon tariff barriers to trade actively, Promote Chinese automobile manufacturing industry to complete green and low-carbon transformation.

1. The purpose and significance of promoting international mutual recognition of carbon certification

The Paris Agreement, adopted at the Paris Climate Conference in December 2015, aims to keep the global average temperature rise below 2 ° C. More than 95 percent of the 196 signatories to the Paris Agreement have submitted their Intended Contributions (INDS). In September 2020, China announced at the United Nations General Assembly the goal of peaking carbon by 2030 and achieving carbon neutrality by 2060. As a new strategy to combat global climate change, product carbon footprint certification can identify the greenhouse gas emission potential and opportunity of a product throughout its life cycle. Product Carbon Footprint is the sum of all carbon emissions within a product's life cycle calculated based on the life cycle assessment method. Some countries have taken the lead in Carbon Labelling, which refers to labelling a product's carbon footprint with a quantitative indicator. This carbon labelling can effectively promote global carbon reduction by influencing the corporate supply chain and consumer choice. There are already more than 1,000 companies around the world that consider carbon labelling in their supply chains, including Tesco, Wal-Mart, and IKEA. It can be said that promoting product carbon footprint certification will become a green marketing method for enterprises to some extent, but also play a greater role in trade competition.

However, some countries and organizations have developed their own carbon accounting standards, such as Japan, Switzerland, Italy, South Korea, and other countries. Different standards have different specific provisions on the carbon footprint accounting process, such as the types of greenhouse gases to be accounted for, accounting scope, system boundaries, calculation methods, etc. The difference in standard provisions will eventually lead to the unequal numerical information on the calculated carbon footprint of products, which is difficult to compare in international trade and supply chains. Therefore, it is particularly important to promote the international mutual recognition of carbon certification and enhance the use value of carbon certification in international trade.

2. Research on International Mutual recognition of carbon certification system

2.1 Development of carbon certification system from an international perspective

In recent years, the European Union, the United States, Japan, and other developed economies have been actively exploring the goal of achieving carbon neutrality by making comprehensive

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plans in terms of climate legislation, energy structure, low-carbon technology, green finance, and other policies. They have made some achievements in reducing carbon and saving energy, providing a reference for global climate development.

2.1.1 EU climate legislation and policy

In 2018, the European Union proposed a goal of becoming carbon neutral by 2050 [1]. In 2019, the EU issued the European Green Deal, which aims to reshape the EU's future development strategy, build the EU into a sustainable economy with efficient use of resources and global competitiveness, and set out the master plan and roadmap for achieving carbon peak and carbon neutrality. The paper puts forward seven ways of economic sustainable development.

2.1.2 Legislation and emission reduction targets of Germany

As early as 1990, Germany has already achieved the carbon peak. In the Climate Protection Act, Germany has set the goal of achieving carbon neutrality by 2050, specifying the rigid annual emission reduction targets for different economic sectors such as energy, industry, construction, transportation and agriculture, and forestry from 2020-2030. In 2021, Germany revised the German Federal Climate Protection Act to propose more stringent emissions targets, bringing forward the date for achieving carbon neutrality to 2045 and increasing the greenhouse gas reduction target to 65% by 2030.

2.1.3 Relevant laws and requirements of France

As a leading country in the Paris Agreement, France has promulgated the Green Growth Energy Transition Law and announced relevant implementation plans. France was the first to propose a way to ensure visible progress by capping greenhouse gas emissions. In 2020, France promulgated the National Low-carbon Strategy Decree, specifying the goal of achieving carbon neutrality by 2050, and has introduced several supporting policies and measures in the fields of construction, agriculture, forestry, and waste. In addition, policies such as the Multi-Year Energy Plan and the Outline of the French National Air Pollutant Reduction Plan have been released, which also provide guarantees for France to achieve the goal of carbon neutrality.

2.1.4 Greenhouse gas emission reduction policies and development paths of the United States

Although the policy of the United States fluctuates continuously due to the influence of political factors, the development direction of the United States has always been to deal with climate change and promote the goal of carbon neutrality. Immediately after taking office in 2021, Biden announced his return to the Paris Agreement and proposed the goal of becoming carbon neutral by 2050. The Zero Carbon Action Plan (ZCAP) aims to promote zero-carbon technologies, build a clean energy economy, optimize industrial policies, and conduct climate diplomacy to achieve the goal of carbon neutrality in the United States by 2050.

2.1.5 UK Legislation on "net zero emissions"

In 2008, the UK promulgated the Climate Change Act, the world's first law establishing the net zero emission target and issued the world's first carbon neutral regulation. In 2019, the UK promulgated the revised Climate Change Act, which formally set the goal of achieving "net zero greenhouse gas emissions" by 2050, defined the roadmap for climate governance, and established a citizen-based credit carbon emission account. On the one hand, the UK takes clean growth as the core of modern industrial strategy and reduces carbon consumption by restricting the development of industries with high carbon emissions. On the other hand, it introduces a series of preferential tax policies to guide enterprises to develop low-carbon production technology and cultivate citizens' low-carbon awareness.

2.1.6 Japan's climate legislation and strategic objectives

Compared with western developed countries, Japan has made relatively late progress in promoting climate legislation and implementing carbon neutrality goals later than Europe and the

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United States. From 1997 to 2011, Japan launched the "about promoting new energy using Cuo Shi Fa Cuo Shi Fa applied to the new energy use," "the twelve great action for low carbon society" the green economy and the social change of the global warming countermeasures for the basic law and a series of laws and regulations, in response to the climate problem, develop green economy has provided a legal basis. In 2020, Japan issued the Green Growth Strategy, which defines the goal of achieving carbon neutrality and building a "zero-carbon society" by 2050, encourages the innovative development of 14 industries including offshore wind power through green investment, and supports the green transformation through standardization reform, tax reduction and other means. In 2021, Japan upgraded its "Green Growth Strategy" to the "Carbon Neutral Green Growth Strategy 2050" and adjusted its original key industries to form a new system of 14 carbon-neutral strategic industries, including offshore wind power, solar power, geothermal power, and next-generation thermal energy.

2.2 Present situation of Chinese carbon certification system

2.2.1 Our country establishes carbon emission accounting system

At present, China has initially established a carbon accounting monitoring, reporting, and verification system (MRV) for key emission industries. For our country, establishing the standard unified and international standard of carbon emission accounting system is a basic work to realize the "double carbon" goal. By 2015, China has published greenhouse gas emission accounting methods and reporting guidelines for 24 industries including mining, coal, petrochemical, electric power, machinery and equipment manufacturing, road transportation, and so on, basically realizing the coverage of the whole industry.

At present, our country has not introduced the national carbon accounting standards for product level carbon accounting. The related standard is still in the formulation process. But in recent years, the product carbon footprint accounting has been widely paid attention to, and the product range has gradually widened. In 2017, Beijing issued the General Technical Guidelines for the Evaluation of Low-carbon Products, which stipulated the calculation method of carbon emissions in the whole life cycle of products and the summation method of evaluation. In the same year, Shanghai issued the General Rules of Product Carbon Footprint Accounting, which also stipulated the specific method requirements of product carbon emission accounting and evaluation. In 2021, Beijing issued the Carbon Footprint Accounting Guide for Electronic Information Products, which stipulated the objectives, accounting scope, functional units, system boundaries, data collection and processing, accounting, reporting and other contents of carbon footprint accounting for electronic information products. With double carbon work gradually in our country, some industries and products have been gradually developed within a certain scope of accounting and emission reduction work [3], in the future, as the EU border carbon adjustment tax and the international carbon market launch, carbon footprint on export products certification will become our country enterprise accounting and carbon emissions accounting and authentication of the focus.

2.2.2 The research work of carbon certification system carried out in our country

In September 2010, the National Development and Reform Commission and the CNCA organized the "Special Topic on Coping with Climate Change -- Research on the establishment of Chinese Low carbon Certification System" [2], marking the full start of this Chinese low carbon certification work. This project is based on the situation and development path of our country, analyzing our low-carbon certification policy and technical demand, researching, and establishing the framework system of our low-carbon certification system. It is a common international practice to establish a certification and recognition system for carbon emission and emission reduction. From the perspective of international development, the international carbon emission evaluation generally adopts the third-party certification body to implement the evaluation, the authoritative accreditation body to audit and supervise the ability of the certification body, and the government and the society to accept the certification results. It is beneficial to speed up integration into

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economic globalization, break carbon border trade barriers, safeguard our national interests in responding to climate change, also be beneficial to our scientific establishment and implementation of the carbon emission indicators, and promote the achievement of carbon neutralization goal of "3060" as soon as possible.

2.3 Development of carbon certification in the automobile industry

In China, the automobile industry as a pillar industry of the national economy has made important contributions to economic and social development. The automobile industry has the characteristics of a long industrial chain, wide-coverage, fast growth of total carbon emissions, and high carbon emission intensity per unit. Bringing the automobile industry into carbon certification management can not only help promote the upstream and downstream industry chain to realize green and low carbon transformation but also has profound significance for our country to realize carbon neutrality as soon as possible.

2.3.1 Carbon footprint accounting of automotive products

The carbon footprint accounting of automobile products can be said to be the premise of carbon certification of automobile products. Only by confirming the accounting boundary, clarifying the data quality of emission data and emission factors, and careful calculation, can accurate and reliable carbon footprint of automobile products be obtained. The carbon accounting for automobile products should include carbon emissions in scope 1, scope 2, and scope 3, such as vehicle use, vehicle assembly, parts production, raw material production, transportation, recycling, and other processes. The carbon emission accounting method of automotive products can refer to ISO 14067:2018 Greenhouse Gases - Product Carbon Footprint - Quantification Requirements and Guidelines, WBCSD and WRI's Product Life Cycle Accounting and Reporting, and BSI's PAS 205:2011.

At present, domestic, and foreign institutions have developed a lot of carbon emission accounting tools to support the accounting of automotive carbon emissions. Take CA-GREET3.0 as an example [3], which is a carbon emission accounting tool developed by California in combination with local characteristics for the development of low-carbon transportation. GREET is a life-cycle assessment model widely used internationally to study energy consumption and greenhouse gas emissions of automotive products. At present, many domestic enterprises and universities conduct carbon accounting of automobile products based on this model and combined with energy structure and emission data with Chinese characteristics. Through the whole life cycle of automotive products of carbon accounting, on the one hand, can help enterprises to identify the car carbon emissions in the process of product production and use of key processes, on the one hand, can help enterprises to better optimization of products, improve efficiency, reduce cost, to guide enterprises to carry out low carbon product technology research and development, promote the comprehensive development of low carbon products.

2.3.2 Carbon certification of automotive products

The carbon certification of automobile products is based on the carbon footprint accounting of automobile products. In other words, under the internationally recognized accounting method, the carbon footprint of the whole life cycle of automotive products is calculated by a third-party accounting institution within the defined boundary range [4]. The carbon footprint level of the product will be evaluated by a third-party certification body, and the products that meet the limit requirements will be certified as low-carbon products. At present, there are many Carbon footprint certification projects in the world that can be used for reference. For example, the UK's Carbon Reduction Label and the US's Carbon Free Label are both product-oriented carbon certification labels based on the accounting and evaluation of third-party organizations. The products that have obtained these carbon footprint certification labels. By pasting an obvious carbon footprint mark on the product packaging, the carbon emission value of the whole life cycle of the product can be declared. In this way, consumers can be guided to choose more low-carbon and environmentally

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friendly products, and enterprises can also fulfill their social responsibilities to increase the influence and competitiveness of products.

2.4 Comparison of product carbon footprint accounting methodologies based on PAS 2050 and ISO 14067

The full name of PAS 2050 is "PAS 2050 Product and Service Lifecycle Greenhouse Gas Emission Assessment Code". It is the world's first accounting standard for product carbon footprint, published by the British Standards Institute (BSI) in October 2008 [5], and the revised version published in 2011 has a wider application scope. This standard is mainly applied to the calculation and evaluation of the greenhouse gas emissions of products and services throughout their life cycle (including raw materials, production, and processing, sales, use, and disposal after waste).

ISO 14067 is a product carbon footprint standard released by the International Organization for Standardization (ISO) in 2012 and evolved from PAS 2050 [6]. This standard provides the most basic requirements and guidance for product carbon footprint accounting and is a more universal standard. Among them, the definition and standard framework of life cycle evaluation are derived from ISO14040 and ISO14044. In contrast, ISO 14067 follows the five principles of relevance, completeness, consistency, accuracy, and transparency proposed by PAS 2050, and makes provisions on the view of life cycle, related methods and functional units, iterative computing methods, selection sequence of scientific methods, avoidance of double counting, participation, and fairness.

As a carbon footprint evaluation standard at the product level, PAS 2050 and ISO 14067 are almost consistent in carbon footprint quantification technology and put forward requirements for improving carbon footprint quantification and reporting transparency, to realize global carbon footprint data comparison. Both PAS 2050 and ISO 14067 encourage the use of third-party certification to form a complete, accurate, and detailed public reporting form [7]. Through the comparison and research of the two standards, it is helpful for our country to establish a more perfect product carbon footprint certification and recognition system, which is helpful for our country to actively deal with carbon tariffs, carbon certification, and other green trade barriers.

3. Proposals to promote international mutual recognition of carbon certification systems

The carbon certification system is a certification activity that complies with international trade agreements. At present, international third-party certification companies such as the British Standards Institute (BSI), SGS of Switzerland, and TUV of Germany have all carried out relevant carbon certification projects in China. For example, the product carbon footprint verification statement, carbon reduction certification, and carbon neutral certification carried out by BSI in China; SGS issued in China based on ISO14067 product carbon footprint verification statement; TUV Rhein has issued certificates for carbon footprint calculation and carbon neutrality for electronic products; In contrast, China's a carbon certification system construction is not perfect, low carbon product certification catalog covers fewer product categories [8], only tire products related to the automobile industry in low carbon product certification catalog, does not match the development trend of Chinese automobile industry under the double carbon goals. Accelerating the construction of carbon certification system in our automobile industry will help to strengthen our position as a strong automobile manufacturing country on the one hand and help to reduce the impact of EU carbon tariff trade barriers on our import and export trade of automobiles and parts.

3.1 Accelerate the formulation of industry-related standards

The construction of a carbon emission standard system for the automobile industry needs to follow certain framework logic. Firstly, the quantitative accounting standards of automobile carbon emissions should be established, including the accounting object, scope, and boundary. The second

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is to determine the basic common class standards, including terms and definitions; Again, the basic standard research on the evaluation method of the automotive product claim cycle is carried out. To achieve the purpose of international mutual recognition of the automotive carbon certification system, international general standards such as ISO 14067:2018 Greenhouse Gases - Product Carbon Footprint - Quantification Requirements and Guidelines, and PAS 205:2011 Code for Assessment of Greenhouse Gas Emissions in the Life Cycle of Goods and Services should also be fully used in the process of the standard preparation. Only by ensuring that the accounting scope, accounting boundary, and accounting methods are consistent, can a meaningful quantitative value of the carbon footprint of horizontal evaluation products be obtained.

3.2 Development path of carbon reduction technology in the automobile industry

According to the research forecast, the total quantity of passenger cars in China will maintain an increasing trend in the future for a period, and the carbon emission of the automobile industry will also continue to increase its proportion in the total carbon emission of China. In the face of such a situation, effective carbon reduction measures must be taken to help the automobile industry achieve the dual carbon goal as soon as possible. On the one hand, with the development of the electric car, the use of electrical energy can be effective instead of high carbon emissions from fossil fuel combustion, but at present, our country is still mainly electricity coal ratio is high, much less inferior coal gas energy characteristics led to our country's power carbon emission factor is higher than in the developed countries, so with the development of China's automobile electric grid clean also is imperative, Strengthening the construction of power grid, improving the efficiency of the power grid, developing energy storage technology, and appropriately developing clean energy according to objective conditions can effectively meet the carbon reduction needs of the automobile industry. On the one hand, we can learn from the efficient material recycling system of foreign countries to strengthen the dismantling and recycling management of scrapped vehicles. Especially some of the relatively high steel, aluminum alloy, copper, plastic, and other recycling materials, and reuse. On the other hand, with the development of intelligent networking, optimizing the existing traffic operation system can improve driving efficiency. For example, intelligent green wave traffic, etc., can recommend the most efficient traffic rate under the current traffic conditions through the collection of traffic data and algorithm operation, and improve the efficiency of traffic operation on a macro level to achieve the goal of carbon reduction.

3.3 Carry out international exchange activities

First, we should strengthen export. Currently, Chinese standards have not been integrated into the international environment, and most countries only recognize international standards. Strengthening the output of China's standard to neighboring countries can not only strengthen the exchanges and cooperation with them in the field of automobile carbon certification but also better guide Chinese automobile enterprises to "go global". The second is to build a platform. Through the establishment of a carbon footprint accounting platform for the automobile industry, a comprehensive and wide-ranging product carbon footprint accounting and certification system is formed, and the carbon footprint accounting and comparison between domestic and foreign manufactured automobiles and parts products is carried out. The third is to expand cooperation, strengthen cooperation with international third-party certification institutions, jointly participate in the development of carbon footprint certification projects of automobile and parts enterprises, give full play to professional expertise and industry status advantages, further expand the influence of the industry, and enhance the awareness of the automobile industry to participate in carbon certification.

ISSN:2790-1688 DOI: 10.56028/aetr.3.1.364

4. Conclusions

This study investigates the status of mainstream product carbon certification in the world and analyzes the current regulations and policies of product carbon footprint certification in various countries. Based on the comparison between PAS 2050 and ISO 14067, the necessity and feasibility of carrying out product carbon footprint certification through third-party certification are analyzed and proposed. The proposed auto carbon product certification system, the international mutual recognition of advice, should accelerate the construction of carbon industry certification standards, promote the development of automobile industry carbon reduction technology and strengthen the international exchange activities to strengthen exchanges and cooperation, and explore automobile products certification program in May, by conducting carbon automobile products certified international mutual recognition, To strengthen the position of Chinese automobile manufacturing power, and promote the realization of the carbon of "3060" as soon as possible.

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