

# Exploration of Carbon Labeling Legal System in the Context of Low Carbon Economy

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**Abstract:** Under the background of climate change, "low carbon economy" based on low energy consumption and low pollution has emerged and become a global hot spot. As an effective tool to cope with climate change and develop low-carbon economy, carbon labeling is getting more and more attention from countries all over the world. However, China's carbon labeling started late, and in the construction of the legal system, it faces problems such as difficult to determine the scope of implementation, non-uniform evaluation standards, and difficulties in the implementation of the system. Therefore, it is proposed that countermeasures should be taken to compile a catalog of carbon labeling products and services, establish uniform evaluation standards, so as to achieve the purpose of developing a low-carbon economy, mitigating climate change and contributing to the early realization of the goals of carbon peaking and carbon neutrality.

**Keywords:** Low Carbon Economy; Carbon Labeling; Peak Carbon; Carbon Neutral

## 1. Introduction

Greenhouse gas emissions have led to global warming, increased extreme weather and threatened global food security.[1] Against this background, new terms such as low-carbon economy, green consumption and carbon labeling based on low energy consumption and low pollution have emerged and become global hotspots. With the development of the global economy, the proportion of carbon emissions at the consumption level is gradually increasing, and how to guide and regulate the public's low-carbon consumption has become a real problem that needs to be solved urgently. Among them, carbon labeling has been promoted and applied in many countries for its effectiveness in energy saving and emission reduction, development of low-carbon

economy and mitigation of climate change.

Carbon labeling was first developed from developed countries, and more than 27,000 products have been carbon labeled globally, and more than 12 countries or regions have passed legislation to require the implementation of carbon labeling system. The United Kingdom was the first country in the world to launch a carbon labeling system, and it introduced carbon reduction labels in 2007. Subsequently, many developed countries have also taken measures to promote low-carbon production and consumption, such as Germany, which introduced product carbon footprints, France, which introduced carbon index labels, and Japan, which introduced carbon footprint labels. However, due to the higher economic and scientific and technological level of developed countries, the carbon labeling evaluation and certification standards and certification costs developed by them are also relatively high, which has caused great pressure on enterprises in China, a developing country, hindered the export of Chinese enterprises and weakened their competitiveness. And China's carbon labeling started late, in 2010 the first food industry low-carbon certification settled in Dalian Swert Island Fisheries Company, China has only opened the prelude to the construction of carbon labeling system.

At present, domestic and international research on carbon labeling focuses on the following two aspects: first, the impact of carbon labeling on consumers' willingness to pay. Using survey data and modeling analysis, Zhang Hong et al. concluded that consumers have a low level of awareness of carbon labeling, but when they can understand the meaning of carbon labeling correctly before purchasing milk products, the attribute of carbon labeling will become an important factor for them to consider. [2] Yonne argue that in most countries, consumers are willing to pay a higher premium for local products

than for carbon-labeled products; [3] second, the impact of carbon labeling on international trade. Shenna suggests that carbon labeling in developed countries and regions will have different degrees of negative impacts on international trade in terms of product exports, carbon footprint assessment, and green industry development and trade structure changes. [4] Katharina believes that carbon labeling restricts the export of products from developing countries and will have a negative impact on developing countries. [5]

China's research on carbon labeling is mainly concentrated in economics, management and other aspects, relatively few studies at the level of jurisprudence, and our country needs to accelerate the establishment of carbon labeling legal system in line with China's national conditions, therefore, from the level of jurisprudence of carbon labeling research has the importance and necessity. In view of this, this paper takes the legal system of carbon labeling as the research object, and on the basis of fully justifying its relevant theories, reflects on the obstacles existing in the implementation of the legal system of carbon labeling and puts forward suggestions for improvement, with a view to achieving the purpose of breaking down the new type of green trade barriers of carbon labeling, and assisting in the realization of carbon peak and carbon neutrality at an early date.

## **2. Overview of the Legal Regime for Carbon Labeling**

Carbon labeling, which is based on the theory of coordinated development of the economy and the environment, is of great significance to the fight against global climate change. The function of carbon labeling is realized through the links of enterprises adding carbon labels, consumers purchasing carbon labeled products, and the government supervising the carbon labeling market. Carbon labeling inevitably encounters many legal problems in the process of implementation, so it is indispensable to build a legal system of carbon labeling, and the definition and analysis of the legal connotation, legal nature, and legal relationship of carbon labeling is the premise and foundation of the study of the legal system of carbon labeling.

### **2.1 Defining the Legal Context of Carbon Labeling**

The Low-carbon economy, which has emerged as a new term in the context of climate change, refers to an economic form that, under the guidance of the concept of sustainable development and through a variety of means, such as institutional innovation, clean energy development and technological transformation, reduces as much as possible the climate change caused by greenhouse gas emissions, thus realizing the purpose of coordinated development of the economy and the environment. Carbon labeling, as an effective means of developing a low-carbon economy, has attracted extensive attention from the international community.

Carbon labeling evolved from carbon footprinting, which originated from the discussion of "food miles" in the 1990s. Carbon labeling is inextricably linked to carbon emissions and carbon footprints. Therefore, to define the legal connotation of carbon labeling, it is first necessary to define the relationship between the three. Carbon emission is the abbreviation of greenhouse gas emission. Carbon footprint is the sum of greenhouse gases emitted by human beings in activities such as production and consumption. Therefore, carbon footprint indicates the sum of carbon emissions. Carbon labeling is a quantitative labeling of a product's carbon footprint. The more carbon dioxide a product produces, the larger its carbon footprint is, and the larger the value on the carbon label is accordingly. Therefore, by calculating the carbon footprint, i.e. the sum of carbon emissions, the carbon label informs consumers of the carbon footprint of a product by labeling it with a "carbon label", thus guiding consumers to green consumption.

At present, although there is no legal definition of carbon labeling in China, the academic definition of carbon labeling is basically the same, i.e., carbon labeling, also known as carbon footprint labeling and carbon labeling, is to mark the total amount of carbon dioxide emitted in the whole life cycle of a product or service from raw material acquisition, production and manufacturing, use to final disposal on the label of the product or service, and inform consumers of the carbon footprint information of the product or service in the form of labels. As an effective tool for carbon dioxide emission reduction, the carbon labeling system can, on the one hand, protect

consumers' right to environmental information and guide them to rational and green consumption, and on the other hand, it can motivate enterprises to improve production technology and low-carbon production to enhance the competitiveness of their products or services, thus achieving the purpose of energy saving and emission reduction, and mitigating climate change. [6]

## **2.2 Analysis of the Legal Nature of Carbon Labeling**

Carbon labeling is environmental in law. Product labeling is a carrier of words, symbols, numbers, patterns and other descriptive representations used to inform about the quality, characteristics, features or methods of use of a product. Carbon labels, as a kind of enterprise product and service labels, disclose the carbon footprints of products and services in the form of labels, which enables consumers to intuitively understand the carbon emission level of the products and services, and can effectively avoid the status quo of asymmetric carbon information of the products and services between the enterprises and the consumers, so as to safeguard the consumers' right to know about the environmental information. Therefore, carbon labeling not only has the legal nature of general product labeling, but also has the environmental law nature of disclosing the carbon footprint of products and services.

Carbon labeling is voluntary in nature. According to whether or not the state through legislation mandatory enterprises to add carbon labeling, carbon labeling can be divided into two kinds of voluntary carbon labeling and mandatory carbon labeling. Mandatory carbon labeling requires companies to label their products or services, which is more conducive to protecting consumers' right to environmental information. [7] Voluntary carbon labeling is not mandatory for enterprises to add carbon labels, so it is more conducive to safeguarding the independent choice of enterprises. Voluntary carbon labeling is mainly market-driven, with enterprises deciding whether or not to participate on their own, and the government's participation is not high. From an international perspective, carbon labeling is dominated by voluntariness, and most countries adopt voluntary carbon labeling, such as the UK

carbon emission reduction labeling, the US climate awareness labeling, etc. France, on the other hand, has established mandatory carbon labeling through parliamentary legislation. Its "New Environmental Protection Act" released in 2010 is a bill on carbon environmental information, the bill requires all products of enterprises must be labeled through the form of marking, labeling carbon emissions information. In China, there is no law mandating enterprises to label their products and services with carbon labels and disclose carbon emission information. Our enterprises often voluntarily improve production technology, develop low-carbon production and certify carbon labels in order that their exported goods or services can meet the requirements of the exporting countries, or in order to enhance the competitiveness of their products. It is thus clear that carbon labeling in China is voluntary.

## **2.3 Carbon Labeling Legal Relationship Defined**

Legal relations are an important legal instrument in the adjustment of social relations by law. [8] Legal relations are the relations of rights and obligations between people formed in the process of adjusting social relations by legal norms. Legal relations include three parts: the subject of legal relations, the object of legal relations and the content of legal relations.

The subject of a legal relationship is a participant in that legal relationship, a subject that enjoys certain rights and assumes certain obligations in the legal relationship. The subject of the carbon labeling legal relationship is the enterprise, the consumer, and the administrative authority, in which the enterprise adds carbon labels to its products or services, the consumer purchases the carbon labeled products, and the administrative authority supervises the carbon labeling market. The object of legal relationship is the object to which the rights and obligations between the subjects of the legal relationship are directed, which is independent of human consciousness, with objectivity, generally including things (property rights legal relationship), payment behavior (debt legal relationship), intellectual property rights (intellectual property rights legal relationship), personality interests (personality rights legal relationship), the object of carbon labeling legal relationship is

the object, that is, the legal relationship of the right of the property. The content of the legal relationship is the rights and obligations of the subject of the legal relationship. For the administrative authorities, carbon labeling certification, supervision and other work is both its rights and obligations. For carbon labeling enterprises, they enjoy the right to obtain preferential treatment and technical support, but also bear the obligation of low-carbon production. For consumers, they enjoy the right to obtain environmental information and supervise enterprises, but also bear the obligation of low-carbon consumption.

### **3. Constraints of China's Carbon Labeling Legal System**

Carbon labeling is an important policy tool that embodies the concept of green and low-carbon development. In international trade, carbon labeling will develop into a green trade barrier, thereby affecting the development of our economy. Therefore, China should also establish its own carbon labeling system. However, due to the late start of carbon labeling in China, it is still a relatively new thing in the country, so carbon labeling is still in the scope of implementation, evaluation standards, system implementation and other aspects of the problem.

#### **3.1 Inadequate Policies and Regulations Make It Difficult to Determine the Scope of Implementation**

The smooth implementation of the carbon labeling system cannot be separated from the constraints and guarantees of the relevant laws, and the scope and types of carbon labels, specific accounting methods, implementation programs, auditing and certification bodies, audit periods, evaluation procedures, and issuance should be clearly stipulated by law. At this stage, China is facing two problems in the legal provisions and system construction of carbon labeling. The first problem is that the existing policies and regulations on carbon labeling are more general and not sufficiently detailed and specific; the second problem is that the scope and types of implementation of carbon labeling have not been clearly stipulated.

Carbon labeling as an "imported goods", a late start in China, the existing carbon labeling policies and regulations are mostly macro

provisions, not specific and detailed. For example, the "13th Five-Year Plan" for controlling greenhouse gas emissions released in 2016 puts forward its goal of establishing a legal system to address climate change, improving the statistical accounting, evaluation, assessment and accountability system, perfecting the low-carbon product standards, labeling and certification system, and establishing an information disclosure system for greenhouse gas emissions, but it does not provide any information on how to. However, there are no specific provisions on how to establish laws, regulations and standard systems to address climate change, and on accounting and evaluation and assessment standards. Another example is the Measures for the Administration of Energy-Saving and Low-Carbon Product Certification, which only makes principle provisions for the certification management units and organizations of low-carbon products, certification labels and supervision and management, etc. Although it specifies the low-carbon product certification directory, rules, and the main body for the formulation and issuance of certificates and the procedures for the implementation of energy-saving and low-carbon product certification, the provisions are rather general and need to be constantly refined and improved.

China's existing policies and regulations do not specify the scope and type of implementation of carbon labeling. In practice, the electrical and electronics industry is the pilot industry for the implementation of the carbon labeling system. Subsequently, the scope of carbon labeling implementation has gradually expanded to automotive, clothing, agricultural and sideline products, food, construction and other industries. However, at present, there is only the Low Carbon Product Certification Catalog in China, and there is no carbon labeling product and service catalog. The existing Low Carbon Product Certification Catalogue includes seven products such as tires and textile fabrics in the certification catalog, however, the scope of low carbon products and carbon labeled products is not the same although there is a crossover, therefore, the Low Carbon Product Certification Catalogue cannot replace the catalog of carbon labeled products and services, and our country should compile the catalog of carbon labeled products and services as soon as possible.

### 3.2 Unharmonized Evaluation Criteria and Lack of Authority in Certification

In 2020, China's Low Carbon City "China Carbon Labeling Evaluation Service Information Platform" went online, and the following year, China's Electronic Energy Conservation Technology Association formulated the "Industry Uniformly Implemented Product Carbon Labeling Voluntary Evaluation Implementation Rules (Provisional)". At this point, China's carbon labeling evaluation work was officially opened. The process of applying for carbon labeling certification on China's Carbon Labeling Evaluation Service Information Platform includes: application and acceptance, product testing, on-site verification, evaluation and approval of certification results, and post-certification tracking and re-certification. Among them, evaluation is one of the key aspects of certification.

In terms of carbon labeling evaluation, China has released a series of group standards. Since 2018, China's Electronic Energy Conservation Association has released more than 10 group standards, including General Rules for Carbon Footprint Evaluation of Electrical and Electronic Products, Carbon Footprint Evaluation of LED Road Lighting Products, Carbon Footprint Evaluation Specification for Liquid Crystal Display Products, Technical Specification for Carbon Footprint Accounting of Mobile Communication Handhelds, Technical Specification for Carbon Footprint Accounting of Microcomputers and Carbon Labeling Evaluation Specification for Low-Carbon Building Products.<sup>2022</sup> In March, the Institute of Wood Industry of the Chinese Academy of Forestry released two group standards, "Carbon Footprint Evaluation and Labeling of Wooden Flooring Products" and "Carbon Footprint Evaluation and Carbon Labeling of Wooden Door and Window Products". However, many industries in China, such as the textile industry, do not have corresponding domestic evaluation standards, so they mainly apply international common standards, such as ISO14064 (1-3), ISO14067, PAS2050 and GHG Protocol, when evaluating textile carbon labels. However, international evaluation standards are not suitable for Chinese enterprises and the current economic status quo, for which Chinese enterprises have

borne a lot of pressure. It can be seen that in the evaluation of carbon labeling, on the one hand, there are only a series of group standards and industry standards in China, and there is a lack of macro, unified evaluation standards that can be applied to all industries; on the other hand, many industries, such as the textile industry, have not formulated evaluation standards in China. In this case, when enterprises carry out carbon labeling certification, it is easy to apply for certification of products or services do not have certification standards or certification standards are diverse, the industry evaluation is chaotic, the lack of authority of the certification, the pressure on the enterprise certification and other issues, which will greatly weaken the authenticity of the authenticity and authority of the certification, a serious impediment to the authentication of carbon labeling in China.

### 3.3 High Pressure on Enterprises and Difficulties in Implementing the System

Because carbon labeling was developed from developed countries and then introduced into our country, certified carbon labeling has higher technical requirements for our enterprises. China is a developing country, economic construction is the center of development, and enterprises also take profits as the first and biggest goal to pursue. Therefore, the high standards and costs of carbon labeling have dampened the enthusiasm of enterprises for certification and seriously hindered the implementation and development of the carbon labeling system.

Nowadays, more and more companies realize the importance of climate information transparency. [9] Carbon labeling is an effective tool for making climate information transparent. Enterprises need to bear the cost of improving production technology and equipment to reduce carbon dioxide emissions on the one hand, and the cost of certification time and fees on the other hand, in order to label their products or services. It can be seen that enterprises will greatly increase their costs and weaken their competitiveness in the short term if their products or services are labeled with a carbon label, which is simply beyond the means of small and medium-sized enterprises (SMEs). In the EU, for example, the application for carbon labeling requires at

least one year and about 1,200 euros in fees, and the annual user fee is about 25,000 euros. [10]Therefore, based on the consideration of economic interests, fewer enterprises in China are carbon labeled. If carbon labeling of products and services becomes a trend or is mandatory, it will lead to many small and medium-sized enterprises being overwhelmed. On the contrary, if enterprises make consumers bear the increased cost of carbon labeling by raising the price, it will lead to loss of consumers or lower competitiveness of carbon labeled products and services by choosing low-priced products and services that are not labeled with carbon labels. From this, we can see that the high technical and cost requirements of carbon labeling have led to problems such as low motivation of enterprises in certification, difficulties in the implementation of the carbon labeling system, and even obstacles to the export of Chinese products.

#### **4. Improvement Path of China's Carbon Labeling Legal System**

By giving the public the right to know about the environment, carbon labeling can, on the one hand, create a low-carbon consumption scenario and guide citizens to green consumption; on the other hand, it can be used as a marketing tool, through which enterprises can show their green and low-carbon image to the public and enhance their competitiveness. Based on the purpose of mitigating climate change and developing low-carbon economy, many countries have established carbon labeling system through legislation or related policies, and China is no exception. As a new type of environmental labeling, China's carbon labeling still needs to be further improved in terms of policies and regulations, evaluation standards, and incentive mechanisms in the process of building the legal system.

##### **4.1 Improve Carbon Labeling Policies and Regulations, and Compile a Catalog of Carbon Labeling Products and Services**

Many enterprises in China in order to meet the needs of product exports have to add carbon labels, but the domestic policies and regulations on carbon labeling is not perfect, the certification lacks authority, so enterprises will entrust foreign institutions to carry out carbon labeling certification, and thus need to

spend a higher cost of authentication, to bear greater economic pressure. Therefore, China in improving carbon labeling policies and regulations, first of all, should comply with the relevant legal rules of the WTO, the most-favored-nation treatment and the principle of national treatment as the carbon labeling legal system of the legislative benchmarks, in order to ensure that China's carbon labeling legal system can be in line with the international community, and does not hinder the development of export trade. Secondly, carbon labeling policies and regulations should be improved on the basis of existing policies and regulations, and the existing provisions on carbon labeling accounting methods, implementation programs, auditing and certification bodies, evaluation procedures, etc. should be refined and specified.

To establish a legal system for carbon labeling, it is very important to clarify its target, because clarifying the target of carbon labeling is the prerequisite and foundation for establishing a legal system for carbon labeling. As far as foreign countries are concerned, the scope of carbon labeling in many countries that have already established a relatively complete and mature carbon labeling legal system is mostly for products that are closely related to daily life, such as clothing, food, housing and transportation. [11] Take the UK as an example, its carbon labeling system is mainly applied to food, toys, and daily necessities, such as bread, fruits, T-shirts, shampoos, and cement. As far as China is concerned, the Low Carbon Product Certification Catalogue issued in 2013 included general-purpose silicate cement, flat glass, aluminum alloy building profiles, small- and medium-sized three-phase asynchronous motors, and tempered glass, etc. The nation's first Individuals Contributing to Carbon Neutrality Action Plan (Carbon Neutrality Xiamen 8) issued by the Xiamen Green Low Carbon Finance and Financial Services Alliance in 2021 called for the establishment of a personal carbon footprint catalog. After that, the Xiamen Property Rights Trading Center's official website launched a carbon footprint directory module, which allows residents to log in to measure their carbon footprints. The directory divides products into five categories: clothing, food, housing, transportation, and use, and involves a wide range of products such as clothing, rice,

eggs, meat and dairy, water, electricity, public transportation, and plastic bags. Therefore, while learning from mature foreign experience, China can make reference to the existing "Low Carbon Product Certification Catalog" and "Individual Carbon Neutral Action Plan" to compile a catalog of carbon-labeled products and services, so as to identify commodities and services that need to be labeled with carbon labels.

#### **4.2 Establishment of Harmonized Evaluation Standards to Enhance the Authority of Certification**

Based on the domestic situation, China should harmonize the evaluation standard of carbon labeling. Evaluation is the key link of carbon labeling certification, and scientific and reasonable carbon labeling evaluation standards are the important foundation for the implementation of carbon labeling legal system. At present, there are fewer evaluation standards for carbon labeling of products and services in China. Shanghai, Shenzhen, Guangdong, Chengdu and other places have introduced some local standards, electrical and electronic appliances, low-carbon buildings and other areas issued some group standards, but these local evaluation standards and group evaluation standards are complicated, and the requirements are also different, which may appear in the same product or service to meet more than one evaluation standard. [12] Therefore, scientific and reasonable carbon labeling evaluation standards should be formulated, a perfect carbon labeling accounting system should be constructed, and the certification system should be improved to avoid the emergence of multi-recognition of one label and to enhance the authority of certification.

Looking at the international arena, China should draw on the evaluation standards common to developed countries and the international community, and try to conform to international standards and be in line with international standards. At present, there are more than 15 carbon labeling evaluation standards in the world, such as PAS 2050:2008 of the U.K. and TSQ 0010 of Japan. PAS 2050:2008 of the U.K., which was implemented in 2008 and revised in 2011, is the first unified methodology for evaluating the greenhouse gas emissions during the life

cycle of a product and one of the most influential evaluation standards in the field of carbon labeling. It is also one of the most influential evaluation standards in the field of carbon labeling. Other developed countries, such as Japan, have also formulated the TSQ 0010 standard according to their own national conditions. The International Organization for Standardization issued ISO / DIS 14067 Product Carbon Footprint - Requirements and Guidance for Quantification and Communication in 2013, which stipulates the scope, principles, quantification methods and other contents of the product carbon footprint, and launched the international carbon labeling evaluation standard ISO 14067, which is applicable to evaluating the carbon footprint of all products and services during their life cycle.[13] Greenhouse gas emissions during the life cycle of all products and services. As a big exporting country, China should speed up the pace of carbon labeling certification and strive for international convergence. But at the same time, carbon labels are technical and local in nature, China should take into account the national situation and social conditions when formulating the carbon label evaluation standard, formulate a unified carbon label evaluation standard that meets the actual situation of China and can be applied to the whole country and the whole industry, and should not set up too high evaluation standards in pursuit of international standards, which will harm the development of domestic enterprises.

#### **4.3 Improve Incentives and Give Economic and Technical Support to Enterprises**

The smooth implementation of the carbon labeling legal system cannot be separated from the strong guidance and support of the government. Many developed countries with mature legal systems on carbon labeling have supported carbon labeling enterprises not only in terms of technology but also in terms of policy. For example, the United Kingdom attaches importance to the development of low-carbon economy, low-carbon production enterprises in technology and other aspects to give strong support. At present, China has carbon point incentives, which shows that the state and the government began to pay attention to the economic support for carbon labeling enterprises, but carbon points as a

measure is still far from enough, and we need to continue to enrich the incentives and types of incentives.

On the supply side, for a product or service to be carbon labeled, it needs to meet the low-carbon requirements of the carbon label. The trend of low-carbon consumption, where consumers are willing to pay a low-carbon premium for products, and the government's environmental policies have driven enterprises to examine their own low-carbon production. [14] China is a developing country, and compared with other developed countries where the legal system for carbon labeling is already mature, the technological level of enterprises is relatively low, so in order to meet the requirements of carbon labeling, they need to improve their production technology and undergo certification, which is a great economic burden for enterprises. If enterprises are required to improve their production technology to meet the requirements for carbon labeling, they need to be given corresponding technical and economic support. Therefore, financial institutions can give credit support to carbon labeling enterprises, and can adopt low-interest loans and priority loans to give enterprises certain preferences; the state can provide financial support for the development of cleaner production, low-carbon environmentally friendly enterprises to improve their production equipment, and can reduce the pressure of certification and mobilize the enthusiasm of enterprises by means of tax incentives and financial subsidies, etc.; the government can, through the means of government procurement, purchase carbon labeling green and low-carbon environmentally friendly enterprises to meet the requirements of carbon labeling. The government can purchase carbon labeled green and low-carbon products, and through the government's lead, guide consumers' market consumption behavior and improve the competitiveness of carbon labeled products and services. [15]

On the demand side, in order to motivate the public to actively participate in low-carbon consumption, the Carbon Label Evaluation Information Service Platform has launched the Digital Carbon Label Campaign, in which a certain number of points, i.e. Carbon Points, can be gained through the purchase of carbon labeled low-carbon products, and the Carbon

Points gained can be exchanged for the items needed by the public through the Low Carbon City, including daily coupons, snacks and drinks. The items include daily coupons, snacks and beverages, and so on. In addition to carbon point incentives, the government should also provide economic support to enterprises so that the prices of carbon labeled products or services are slightly higher than or equal to the prices of similar ordinary products or services, so that consumers will not be discouraged from purchasing carbon-labeled products or services due to their high prices. Some studies have shown that policies and measures of economic incentives are important factors influencing residents to engage in green and low-carbon consumption. [16] Therefore, consumption coupons for carbon-labeled products and services can be issued on a regular basis or during holidays to stimulate consumers to purchase carbon-labeled products while promoting carbon-labeled products and services to the community. [17]

## 5. Concluding Remarks

As an effective tool for reducing greenhouse gas emissions, mitigating climate change and circumventing green trade barriers, carbon labeling certification has become an international development trend. In the context of low carbon economy, governments are also paying more and more attention to the important role of carbon labeling. The carbon labeling system will have a serious impact on those commodities with high energy consumption and high carbon content but low added value in China's export commodities. Moreover, China's carbon labeling started late, the legal system is not perfect, and there is still a lot of room for development in the future. Therefore, China should formulate a carbon labeling legal system in line with China's national conditions as soon as possible, and at the same time, try to converge with the international standards, in order to break down the green trade barriers, develop a low-carbon economy, and contribute to the early realization of carbon peaks and carbon neutrality.

## References

- [1] Wu Caixia. Research on the synergistic effect of China's low-carbon economic



- development. *Management World*, 2021, 37(08):105-117.
- [2] Zhang Hong, Han Zixu, Xiong Hang. Urban Consumers' Preferences for Carbon-Labeled Milk and Their Sources of Heterogeneity - An Analysis Based on the Choice Experiment Approach. *Research on Agricultural Modernization*, 2021, 42(01):112-122.
- [3] YONNE F, KATRIN Z. Consumers' preferences for carbon labels and the underlying reasoning. A mixed methods approach in 6 European countries. *Journal of Cleaner Production*, 2018, 178:740-748.
- [4] Shen Na. Research on the Impact of Carbon Labeling System on China's International Trade and Countermeasures. *Ecological Economy*, 2019, 35(05): 21-25.
- [5] KATHARINA P. Comparing voluntary sustainability initiatives and product carbon foot printing in the food sector, with a particular focus on environmental impacts and developing countries. *Development Policy Review*, 2018, 36(04):503-523.
- [6] Lan Zirui. Innovative Models of Carbon Labeling System in Developed Countries and Implications for China. *Environmental Protection*, 2020, 48(12):71-73.
- [7] Luo Ying, Wang Yue. Mandatory or Voluntary: The Choice of Legislative Progress of Carbon Labeling in China. *Journal of China University of Geosciences (Social Science Edition)*, 2017, 17(06): 93-104.
- [8] Huang Jianwu. Legal relationship: an analytical framework of legal adjustment. *Journal of Harbin Institute of Technology (Social Science Edition)*, 2019, 21(01):3-10.
- [9] Xiong Kairong, Liu Chao. Low-carbon marketing communication innovation: concept, strategy and method. *Journalism and Communication Review*, 2018, 71(02): 42-51.
- [10] Lian Ping, Chang Ran. Challenges and Countermeasures of Carbon Neutrality on China's Foreign Trade. *New Finance*, 2022, (01): 4-9.
- [11] HE Ke, WANG Hao, ZHANG Junbiao. "Agricultural Transformation Path under the Goal of "Double Carbon": From Market to Market. *Journal of Huazhong Agricultural University (Social Science Edition)*, 2022(01): 1-9.
- [12] Shen Chengran, Liu Xiaoyuan. Research on Supply Chain Decision Making of Supplier Participation in Carbon Emission Reduction under Carbon Labeling System. *Industrial Engineering*, 2018, 21(06): 72-80.
- [13] Liu Wenwen, Hu Zhenhua. Research on low carbon production behavior of enterprises under market autonomy and low carbon certification situation. *Operations Research and Management*, 2022, 31(04): 232-239.
- [14] Qiu Feng. International Practice of Carbon Labeling System and Its Inspiration and Reference to China's Exploration. *Southwest Finance*, 2021 (12): 28-42.
- [15] LIU Qiqiu, WU Minglong, LIU Guangfei, et al. Research on personal carbon trading model and its implementation path under "Internet +" green ecological perspective. *Ecological Economy*, 2022, 38(05): 47-52.
- [16] Zhang Jingjing, Wang Jianling. Joint Analysis of Residents' Low-Carbon Consumption Behavior and Preferences for Low-Carbon Measures--Taking Jiangsu Province as an Example. *Modern Management Science*, 2022(02):23-31.
- [17] Liu He, Fan Lili. Research on willingness to pay "premium" for carbon labeling products and its influencing factors. *Price theory and practice*, 2018(05):123-126.