

# Theoretical Analysis and Framework Design of Carbon Inclusion Mechanisms from the Perspective of Carbon Emission Trading Markets

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## Abstract

According to the Global Carbon Emissions Report 2023, China's carbon dioxide emissions are about 12.7 billion tons, accounting for 34% of global carbon dioxide emissions, ranking first in the world. With China's rapid socio-economic development and growing population, there exists a huge potential for carbon emission reduction in the field of residential consumption. As an innovative voluntary emission reduction mechanism for individual low-carbon living and consumption in China, the Carbon Price Reduction System (CPRS) helps to encourage individual emission reduction behaviors, thus promoting carbon emission reduction. From the perspective of theoretical analysis and comparative case study, this paper analyzes in depth the operation logic of the carbon preference system, combs through the current status of carbon preference system practice and compares it, and puts forward the design of the carbon preference system framework which is led by the government, driven by the enterprises, promoted by the financial institutions, and participated by the public. The key link of this system is to quantitatively assess the contribution of individual carbon emission reduction, and build an effective incentive system based on this to cultivate individuals' low-carbon living habits based on the principle of "whoever reduces emissions, whoever benefits". This paper analyzes the development path of China's carbon preference system and the related suggestions, which can help stimulate the public to participate more actively in carbon emission reduction actions and help China's "dual-carbon" goal to be realized. This system will be continuously improved in practice and make greater contributions to China's green and low-carbon development.

## Keywords

Carbon Inclusion, Carbon Emission Rights, Green Low Carbon, "Dual Carbon" Targets.

## 1. Introduction

Dual Carbon is China's carbon reduction target to be gradually accomplished in two phases (referred to as the "Dual Carbon" strategic goal), i.e., carbon dioxide emissions will strive to peak by 2030, and efforts will be made to achieve carbon neutrality by 2060. The Carbon Inclusive Mechanism utilizes digital technologies such as Internet big data and blockchain to quantify and assign a certain value to the behaviors of micro and small enterprises, communities, families and individuals through low-carbon methodologies, and applies incentive policies and positive guidance mechanisms such as emission reduction trading and verification to help achieve the "dual-carbon" goal, so as to build a measurable public carbon emission reduction mechanism. The public carbon emission reduction mechanism can thus be

constructed in a measurable way. At present, China's carbon benefits mechanism can be categorized into government-led and enterprise-led carbon benefits mechanisms. Government-led carbon credit mechanisms are mainly promoted and established by local governments, while enterprise-led carbon credit mechanisms include those initiated and established by general enterprises and financial institutions. However, there is not much difference in the operation of the various types of carbon credit mechanisms. Most of them rely on the carbon credit platform, and through docking data with third-party organizations, they calculate the amount of emission reductions from public low-carbon behaviors under low-carbon scenarios in accordance with specific standards, and give corresponding carbon credits in accordance with certain rules. The points can be used to exchange for commercial concessions, public services, etc. on the platform, or can enter the carbon emissions trading market to transfer excess carbon emission allowances to enterprises. At present, the incentives and emission reduction scenarios of the carbon credit mechanism are relatively single, and the incentives for the public are insufficient, which makes the public's participation in the carbon credit mechanism insufficient.

The carbon preference system plays an important role in promoting the development of a low-carbon economy and realizing the goal of carbon neutrality. First of all, the GSP can encourage individuals and enterprises to reduce carbon emissions. By giving incentives such as certain rewards or tax reductions to emission reduction actors, people can be motivated to participate more actively in emission reduction actions.

In view of this, based on the perspective of carbon emissions trading market, this study innovates the carbon inclusion system by analyzing the operation mechanism and application cases of the carbon inclusion system, and proposes that a carbon inclusion system suitable for the consumption habits of Chinese residents should be established through the establishment of the "Trinity" carbon account, the quantification of convertible behaviors, and the construction of an underlying digital platform, etc., so as to provide a theoretical basis for the government and enterprises to manage carbon dioxide, and to promote China's carbon emission reduction. This will provide a theoretical basis for the government and enterprises to manage carbon dioxide and promote carbon emission reduction in China.

## **2. Literature review**

### **2.1. Literature related to the application of carbon emissions trading markets in green innovation**

In recent years, controlling greenhouse gas emissions has become a hot topic in the world. In order to control greenhouse gas emissions, scholars from various countries have put forward many innovative proposals in terms of policy design and mechanism design, and have formed abundant theoretical research results. The concept of "carbon emissions trading" was initially proposed by Dales, at first Dales gave the program applied in water pollution control, and later Dales proposed the means of carbon dioxide emissions trading. Carbon emissions trading market is a market-based policy tool, which controls and reduces carbon dioxide emissions and promotes green and low-carbon development by setting a cap on the total amount of carbon emissions and allowing the trading of carbon emission rights. The carbon emissions trading market can not only provide economic incentives to combat climate change, but also promote the innovation and transformation of green technologies, improve energy efficiency and resource utilization, and enhance environmental competitiveness and sustainable development.

At present, many studies in the academic community support the "Porter's hypothesis", Liao Wenlong et al. (2020) found that exploring market-based environmental regulation has a significant role in promoting the level of green innovation at the provincial level through the

study of carbon emissions trading reform. Liu Ye et al. (2017) found that the carbon emissions trading pilot policy has a positive effect on the R&D innovation of enterprises, but there is a difference in the scale of this effect, and the study shows that the incentive effect of the carbon emissions trading pilot policy is only manifested in large-scale enterprises, and the innovation investment of small-scale enterprises is not significantly affected by the policy. Li Qingyuan and Xiao Zehua (2020) confirmed from the enterprise perspective that market-based environmental regulation sewage charging reform can effectively promote the level of green innovation in enterprises.

China has not established a carbon emissions trading market for a long time, and the world has not built a unified carbon emissions trading market, which makes the number of samples available for research is very small, and thus the role of carbon emissions trading for the application of green innovation only stays at the level of hypothesis, and the specific results need to be further explored.

### 2.2. Literature on framework innovations for carbon inclusion mechanisms

The carbon inclusion mechanism is an innovative mechanism that uses digital technology to quantify and incentivize the low-carbon behaviors of the public and small and microenterprises, which helps to promote the participation of the whole society in carbon emission reduction and helps the country to achieve the dual-carbon goal.

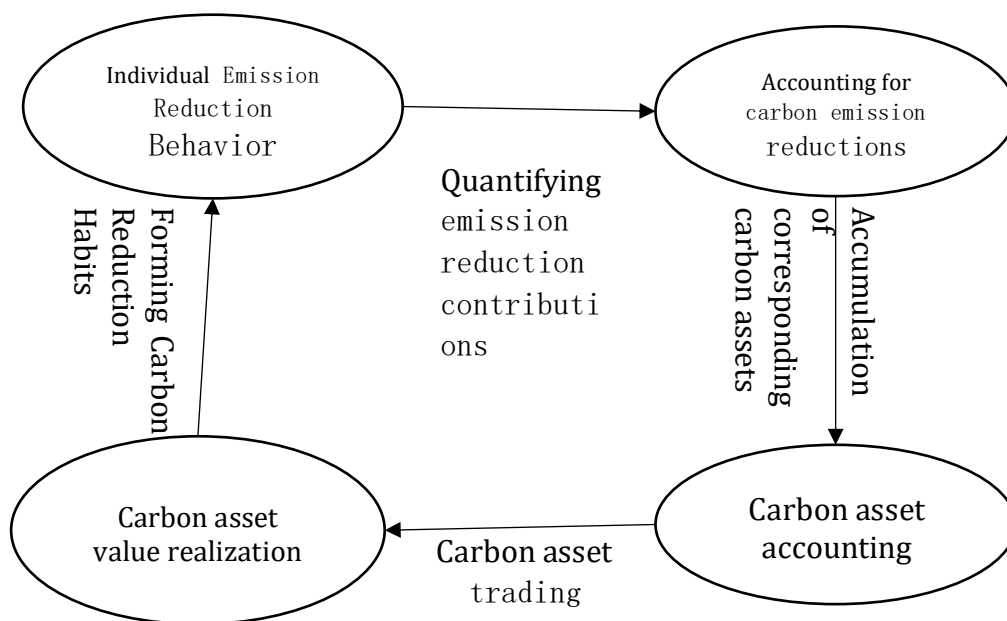


Figure 1: Carbon Inclusive Operating Mechanism

The innovations regarding the framework of the carbon inclusion mechanism mainly include the following four aspects. First, the top-level design and legislative guarantee of the carbon inclusion mechanism. For example, the Regulations on Green Finance of the Shenzhen Special Economic Zone and the Regulations on Ecological Environmental Protection of the Shenzhen Special Economic Zone clearly put forward the plan to establish a carbon inclusion mechanism, while the Measures for the Administration of Carbon Inclusion in Shenzhen regulates and promotes the construction and operation of the carbon inclusion system from a legal perspective. Second, the methodology and standard construction of carbon inclusion mechanism. Hu (2022) mentions that it is necessary to accelerate the research on carbon inclusion methodology in each region and develop local characteristics of carbon inclusion

system methodology according to local characteristic industries. At the same time, a more practical methodology should be selected as the methodology of the national carbon preference system, so that it can be applied to areas with universality, such as transportation and supermarkets, to unify the standards of each place, to smooth out the national carbon preference market, and to ensure fairness, justice, openness and transparency. For example, Guangdong Province has approved seven provincial-level carbon GSP methodologies, including in the areas of forestry, domestic air-source heat pump water heaters, reuse of discarded clothing, energy-efficient air conditioners, and bicycles. Chengdu City has emphasized the development of carbon emission reduction project methodologies as well as the evaluation of low-carbon scenarios, and has issued eight project methodologies and four types of evaluation specifications for low-carbon scenarios in the consumer sector. Meanwhile, in the process, it accelerates the construction of personal carbon footprints and carbon accounts under the corresponding low-carbon scenarios, as well as the security of personal data information, and accelerates the construction of the corresponding infrastructure, in order to promote the healthy development of the carbon inclusion mechanism. Third, the incentive mechanism and trading mechanism of the carbon inclusion mechanism. Liu Hang (2018) points out that the core of the carbon inclusion mechanism is the incentive model, which allows the carbon emissions of individuals, authorities, enterprises and institutions to be offset through the trading system. Guangdong Province and Shenzhen City have respectively established a provincial-level carbon PHCER and a "dual-linkage-four-drive" carbon inclusion system to complement and promote the development of the carbon emissions trading market. Fourth, the platform construction and information service of carbon inclusion mechanism. Zeng Hongying et al. (2021) argue that the construction of a unified platform plays an important role in the implementation of carbon inclusion, both at the individual level and at the enterprise level. For example, Guangdong Province has built a unified carbon platform "Low Carbon P&P", which rewards low-carbon behaviors such as saving water and electricity and taking public transportation with "carbon coins", which can be exchanged for commercial preferential services. The public can redeem "carbon coins" for preferential commercial services. Shenzhen has launched the "Low Carbon Planet" mini-program, which calculates the amount of emission reduction by the public according to a specific formula and rewards the public with corresponding points, which has greatly increased the enthusiasm of the public.

### 2.3. Literature review

Carbon emissions trading and carbon preference system are both major policy instruments for controlling greenhouse gas emissions in China, and there are both commonalities and differences between them. Most of the studies believe that carbon emissions trading has a positive effect on the carbon emission reduction and green innovation behavior of enterprises, and that the carbon preference system also has a positive effect on the enthusiasm of residents to participate in carbon emission reduction. However, due to the differences in the theoretical basis, subject objects and incentives and constraints of carbon emissions trading rights and carbon benefits system, there is no organic unity of carbon emission reduction system between the two. This paper draws on the characteristics of the carbon emissions trading market, combines the advantages and disadvantages of the existing carbon inclusive system, and innovates the carbon inclusive system framework.

### 3. Theoretical analysis

#### 3.1. Conceptualization of the GSP and the carbon emissions trading market

##### 3.1.1. Carbon GSP

Carbon GSP was proposed by the Guangdong Provincial Development and Reform Commission in 2015, and the research and pilots on carbon GSP are still in the beginning stage, without a unified conclusion. Liu Haiyan and Zheng Shuang (2018) define carbon P&P as a system based on identifying the green and low-carbon behaviors of small and micro enterprises, community families and individuals, and achieving the purpose of guiding the whole society to participate in green and low-carbon development through voluntary participation, behavioral records, accounting and quantification, and the establishment of incentive mechanisms. In addition to academic discussions on carbon GSP, the governments of some carbon GSP pilot cities also defined carbon GSP when they issued relevant documents. For example, the Development and Reform Commission of Guangdong Province proposed in 2015 that the Carbon GSP aims to quantify and assign value to the energy-saving and carbon-reducing behaviors of small and micro-enterprises, community households and individuals, and at the same time build a positive guidance system that combines business incentives, policy encouragement and trading of certified emission reductions. On this basis, GZDRC further explained that the Carbon GSP is a system that quantifies the carbon reduction generated by the public's green behaviors and gives it back in the form of carbon incentives through financial subsidies, commercial incentives and other means.

##### 3.1.2. Carbon credits market

Carbon trading is a policy tool based on Coase's theory of property rights, aimed at correcting environmental externalities. Carbon market, on the other hand, is a carbon pricing mechanism established on the basis of total control targets to realize emission reduction targets at a lower cost through market mechanisms. The basic principle of the carbon market is to define the property rights of carbon emissions, and the core issue therein is the carbon price.

The concept of a carbon market was originally derived from the emissions trading market. The theoretical basis for this trading mechanism is derived from the theory of negative externalities in environmental economics with respect to pollution. A negative externality is the effect of an individual's behavior on other people or society that is not reflected by market prices. This negative externality is particularly pronounced in the case of environmental problems, where the act of polluting causes damage to the environment that is not directly reflected in the polluter's income, and therefore needs to be internalized in some way.

#### 3.2. Theoretical analysis of the Generalized System of Carbon Preferences (GSP)

Theoretically, the operation of the carbon GSP covers two core phases and is influenced by a combination of multiple variables.

##### 3.2.1. Stages in the transformation of green low-carbon potential into green low-carbon behaviors

The first stage focuses on the transformation of green low-carbon potential into actual behavior, a transformation that is not spontaneous but is driven by a combination of both conventional and incentive variables.

The conventional variables assess the low carbon literacy of individuals, covering low carbon awareness, ability and individual differences. Low carbon awareness reflects individuals' attitudes and sensitivity to low carbon; low carbon capability is based on low carbon environmental knowledge and life experience, with knowledge including environmental awareness, low carbon issues and action skills, and life experience from people around us,

books, religions, environmental organizations and other dimensions. Individual differences include low carbon values and sense of responsibility, and socio-demographic characteristics such as age, gender, education, occupation, income and family background should not be ignored.

Motivational variables are derived from expectation theory, including valence and expected value. Efficacy relates to the individual's subjective assessment of the value of green and low-carbon behaviors, and the higher the value perception, the stronger the motivation; expectation is the individual's prediction of the possibility of realizing the behavior, and the higher the prediction, the higher the rate of realizing the behavior.

To summarize, carbon preference system is an interdisciplinary system engineering, and in-depth analysis of the mechanism of routine and incentive variables will help to comprehensively understand its operation mechanism and lay a theoretical foundation for the formulation of efficient carbon preference policy.

**3.2.2. At the stage where short-term episodic behaviors are transformed into long-term persistent behaviors**

This stage consists of two key components: first, the crediting of green and low-carbon behaviors, which means that the green and low-carbon behaviors of an individual's daily life that reduce greenhouse gas emissions are converted into a certain number of credits through a specific methodology. Different carbon credits are generated according to different types of green low-carbon behaviors. This process can incentivize individuals to actively participate in green low-carbon behaviors by setting up a reward mechanism, thus prompting them to pay more attention to environmental protection and sustainable development in their daily lives.

The second is the long-term sustainability of green low-carbon behaviors. After an individual has earned a certain amount of carbon credits, there is also a need to sustainably modify the individual's daily behavior so that green and low-carbon behaviors become self-conscious. This requires rewarding individuals who actively adopt green low-carbon behaviors through positive reinforcement incentives in terms of policies, business and transactions to further consolidate their awareness and capabilities. For individuals with non-low-carbon behaviors, negative reinforcement incentives are needed to guide them to change their behavioral habits and gradually shift to a green and low-carbon lifestyle.

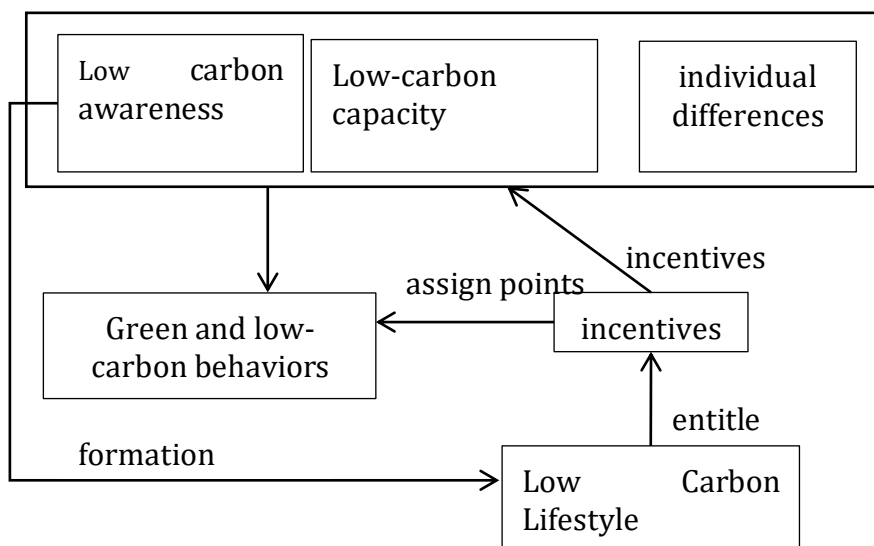


Figure 2: Rationale for the Generalized System of Carbon Preferences

## 4. Carbon GSP practices and experiences

### 4.1. Carbon GSP practices abroad

#### 4.1.1. Gwangju Carbon Banking Mechanism, Korea

Gwangju City in South Korea, where nearly half of the greenhouse gases emitted come from households and businesses, has implemented a "carbon banking system" in its jurisdiction since 2008. The system calculates the amount of carbon dioxide emissions reduced by households' voluntary energy-saving behaviors (electricity, natural gas, water, etc.) and converts it into points, which allow participating households to enjoy corresponding fee reductions. Gwangju Bank issues carbon green cards to participating households and records the points. In the pilot phase of the "carbon banking system," the government, banks, businesses, and the public each play their own roles.

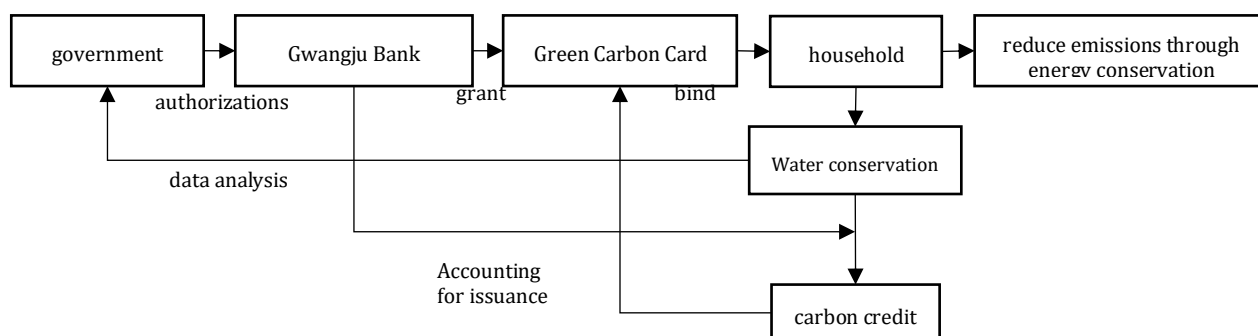


Figure 3: "Carbon Banking System" in Gwangju City, South Korea

#### 4.1.2. American Joro APP

In April 2020, the United States launched the Joro APP, which charges users for the greenhouse gases they emit. The Joro APP establishes a personal carbon account, and after the user binds a bank card, the APP automatically calculates the carbon emissions according to a certain standard and deducts the money every month. Since the user's carbon emission data is known through the questionnaire released by the APP, the data results are relatively subjective. According to the data table, the average monthly deduction of the APP users is about 25 USD, of which 80% is used for the cooperation platform with public welfare programs, and the remaining 20% is used as the platform's daily operation costs. The data on the official website of the APP shows that the carbon emissions of the APP user group dropped by 21% in 2021 compared with the previous period.

## 4.2. Carbon GSP practices in China

### 4.2.1. Ant Forest

With the development and application of emerging technologies, Internet companies have begun to explore ways to promote the public to form a green life, among which Alipay Ant Forest's program is the most successful. Users can open the entrance to Ant Forest in Alipay and enter their homepage, on which they can see their saplings and green energy. Users generate green energy in a variety of ways, such as walking, riding shared bikes, and public transportation. Users can collect the green energy they generate in their own homepage, or visit their friends' homepages to collect the green energy that their friends have not collected in time, and then use the green energy to exchange for real saplings, choose the species of the tree and the area where it is to be planted, and also name their saplings. Each sapling has a unique number, and users can view the real planting situation through the satellite map. Users can also display their public welfare achievements in various ways, such as love tree, affection tree,

friendship tree, and certificate of national compulsory tree planting. Users can also participate in various public welfare activities through Ant Forest, such as National Tree Planting Day and Earth Hour. Ant Forest data show that as of 2023, Ant Forest has accumulated more than 500 million users, planted a total of 200 million seedlings, and planted a total area of 2.8 million mu.

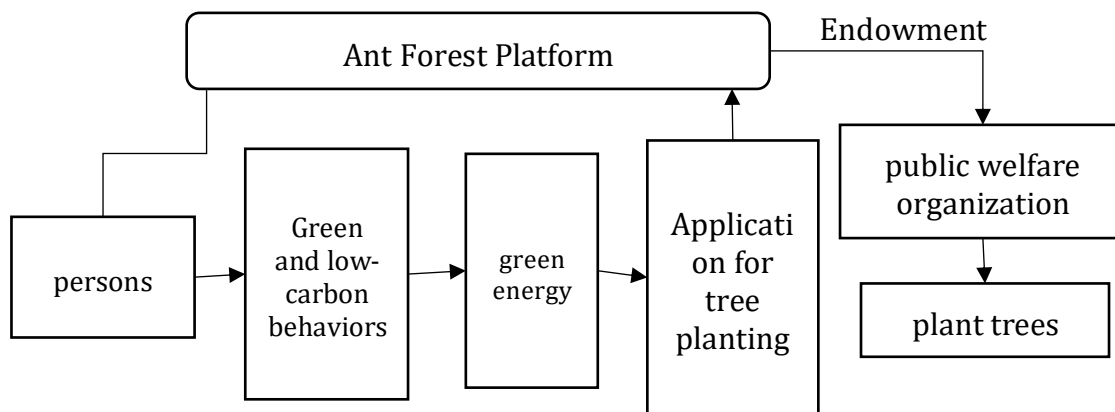


Figure 4: Ant Forest operation logic

**4.2.2. Shenzhen Carbon GSP Practice**

Shenzhen is the first city in China to establish a mechanism to incentivize broad social participation in carbon emission reduction, proposing to build a "dual-connection-four-driven" carbon inclusion system, i.e., to connect low-carbon behaviors with the carbon trading market through a data platform, and to provide incentives and support in four ways: policy, business, public welfare, and trading. 2021 will see a "Low-Carbon Planet App" jointly released by the Shenzhen Bureau of Ecology and Environment and Tencent. The Bureau of Ecology and Environment and Tencent jointly released the "Low Carbon Planet Small Program", and relevant data shows that the total number of visits to the small program reached 1.5 million in just three months after its launch, and the number of independent users reached 870,000. Using the small program, the public can obtain carbon points through low-carbon behaviors, which can be exchanged for gifts, Users can use these carbon points to exchange for gifts, participate in public welfare activities, or use them for incentives such as license plate qualification.

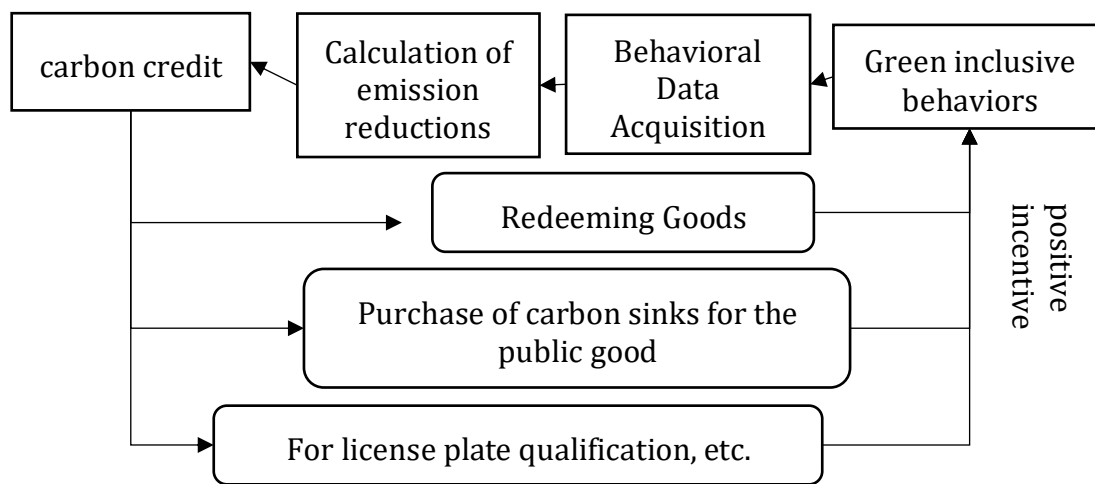


Figure 5: Operation logic of Shenzhen "Low Carbon Planet Small Program"

## 5. Framework design of the Generalized System of Carbon Preferences

According to the characteristics of the ecological environment, around carbon neutrality, carbon emission reduction and other related topics, based on the analysis of the experience and problems of the existing carbon inclusive platform, this paper argues that China should build a sustainable development platform for the government, enterprises, individuals, and social organizations to share the common governance and construction, and use modern technical support such as the Internet, big data, and other modern technologies to strengthen cooperation in the areas of quantification standards, emission reduction trading, and upstream and downstream synergies, and build an effective positive incentive system for residents' carbon emission reduction, starting with the business incentive, trading incentive, and credit incentive. In addition, we should start from commercial incentives, trading incentives and credit incentives to build an effective positive incentive system for residents to reduce carbon emissions, formulate unified measurement and emission reduction standards, cultivate residents' awareness of low carbon and emission reduction, and realize the greening and decarbonization of their lifestyles.

### 5.1. Establishment of a "trinity" of carbon accounts for individuals, enterprises and the Government

According to research findings, since greenhouse gases, carbon emissions and other products with the attributes of public goods are prone to administrative failures, it is not possible to fully realize the goal of greenhouse gas emission reduction if we rely on purely administrative means to regulate them. Therefore, the path to carbon reduction is basically to set up carbon accounts for enterprises and individuals, formulate a unified and consistent standard, and collect data on the various platforms such as Internet companies and financial companies, and conduct quantitative research on the carbon emissions of residents and enterprises, while the government is responsible for the formulation, implementation and supervision of policies related to carbon inclusion. Therefore, the carbon reduction path is basically through the establishment of corporate and individual carbon accounts, the formulation of uniform and consistent standards, the collection of data by various platforms such as Internet companies and financial companies, and the conduct of quantitative research on the carbon emissions of residents and enterprises, while the government is responsible for the formulation of policies, implementation and supervision of the Carbon Inclusion System, and emphasizes the public's proactive participation in the carbon inclusion mechanism.

Carbon account is to use big data and other technologies to collect users' daily consumption data through multiple platforms to assess the carbon emission reduction behavior in users' daily life activities of clothing, food, housing and transportation, and form carbon account points. Users can record and query the carbon emission reduction data in real time. For the emission-control enterprises, through green activities, the emission-control enterprises can obtain carbon account points. For emission-control enterprises, carbon credits obtained by emission-control enterprises through green activities or by purchasing carbon credits from residents can be used to offset their own carbon emissions at a certain ratio, increasing the emission control costs of emission-control enterprises, thus making them reduce carbon emissions. According to the main sources of carbon emissions in 2020, it can be seen that at this stage, carbon emissions mainly come from the energy sector and industrial processes, with the energy sector accounting for 77% and industry accounting for 14% of the total, while the consumption of energy in the form of energy comes from the use of energy in the scenarios of individuals, household water and electricity, heating equipment, garbage disposal facilities, and various types of automobile fuel. From this point of view, these carbon emissions mainly come from personal daily consumption carbon emissions and corporate carbon emissions, so the

establishment of personal and corporate carbon accounts is of great significance in reducing carbon emissions.

In measuring green consumption and inquiring about carbon emission reduction data, it is inevitable to face a series of problems such as the establishment of unified standards and the security of users' private data, etc. In order to solve this series of problems, it is necessary for the government to formulate relevant policies, standardize and measure the standards of carbon emission reduction, use the relevant provisions of users' private data, establish the method of defining the ownership of data, and make a reasonable arrangement of defining the jurisdiction and the right of use of the data and other rights and interests, so that relevant platforms to use uniform measurement standards and reasonable and legal use of users' private data.

### 5.2. Clarifying the list of convertible behaviors and improving the quantitative incentive mechanism

The list of various types of residents' green and low-carbon behaviors that are included in carbon preference is called the list of residents' carbon preference behaviors, which is formulated by the government and specifies convertible behaviors that are a prerequisite for the subsequent ability to be effectively developed into standardized green and low-carbon scenarios and to promote the long-term sustainable development of residents' carbon preference. Therefore, the list of residents' carbon inclusive behaviors should be as complete as possible, incorporating various scenarios of low-carbon behaviors of emitting enterprises and closely related green and low-carbon behaviors of residents in the fields of clothing, food, housing, transportation, and use of life, consumption, travel, and public welfare, to achieve the full scenarios and coverage of carbon inclusive behaviors of resident groups with different living and consumption habits as much as possible. As shown in the figure below:

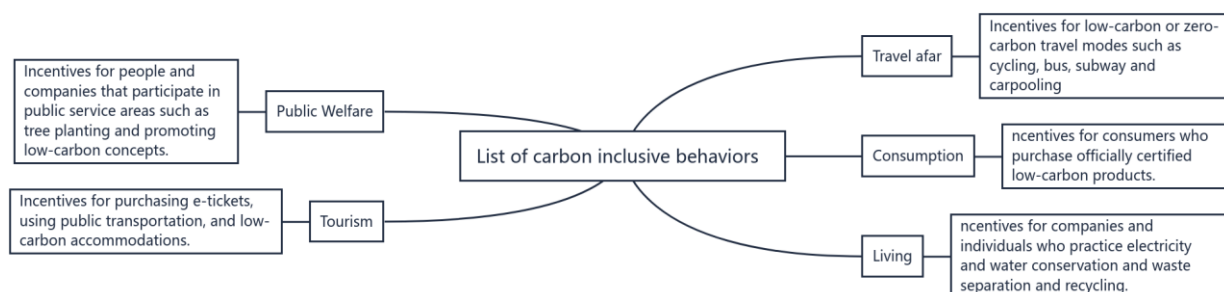


Figure 6: List of carbon inclusive behaviors

After clarifying the list of convertible behaviors, a series of incentive mechanisms should be formulated so that multiple market players, including residents, government, commercial organizations, financial institutions, etc., can actively participate in the carbon credit system, build a sustainable carbon credit ecosystem and establish a set of carbon credit system for residents with a wide range of application scenarios. Green and low-carbon behaviors are mainly affected by two types of variables: conventional variables and incentive variables. Incentive variables include the two expectation theory related variables of potency and expectation value. Therefore, three kinds of incentive mechanisms can be constructed, namely, an autonomous incentive mechanism for enterprises, a carbon trading incentive system led by enterprises with the joint participation of the government and financial institutions, and an incentive mechanism for individual carbon credit construction in cooperation between the government and financial institutions with the assistance of enterprises. Business incentive is that enterprises identify consumers' green behaviors according to their own business, and then provide corresponding material incentives according to the standard; trading incentive is the cooperation between the government and enterprises, enterprises pool carbon emission

reductions, declare the relevant projects, and obtain the proceeds to be returned to the users proportionally; credit incentive, through measuring and summarizing green and low-carbon behaviors, credit rating, and giving the users with high ratings the benefits of preferential interest rates on loans, loan amount enhancement, and so on.

### **5.3. Establishment of a digital substrate platform for the integrated measurement of emissions reduction behaviours**

The digital platform is a digital service hub that integrates many kinds of digital technologies, and its architecture is mainly divided into four layers, including the IoT terminal device layer, the data collection layer, the data processing layer, and the application service layer, and its main features are data, high efficiency, computational power, availability, and complexity, and it brings a lot of opportunities and challenges for the development of carbon inclusive system. The use of digital technology can make the daily life of clothing, food, housing and transportation convenient and fast, making carbon inclusion more convenient and efficient. The underlying platform of digitization is bilateral in nature, and its goodness depends on the way it is used.

As carbon emission reduction on the personal life and consumption side is extremely dispersed, extensive, and changes with the public's consumption willingness and behavior, it makes it more difficult to account for carbon emission reduction, especially when comprehensively measuring emission reduction behaviors, it is often necessary to rely on data aggregation platforms to collect, aggregate, and quantify data on the public's low-carbon behaviors, which is reflected in a more obvious way. The carbon inclusion mechanism needs to solve the difficulties of collecting and measuring carbon emission reduction data, and to reduce transaction costs and stimulate market vitality. To this end, modern technologies such as the Internet, big data and machine learning can be utilized to achieve intelligent synergy of digital technologies. This will enable better coordination between people and equipment, and equipment and equipment, improving efficiency and equipment utilization. At the same time, digital technology can reduce the cost of money manufacturing, circulation, storage and transactions. Considering the green, low-carbon and inclusive characteristics of the Carbon P&P mechanism, the establishment of a third-party digitalized green living carbon reduction substrate platform is essential.

## **6. Summary**

The framework of the carbon inclusive system described in this paper consists of three parts: establishing a "trinity" of carbon accounts for individuals, enterprises and the government ; clarifying the list of redeemable behaviors and perfecting the quantitative incentive mechanism; and establishing a digital substrate platform to comprehensively measure emission reduction behaviors, which will make use of machine learning, big data and other digital technologies to promote the greening and decarbonization of residents' lifestyles through the concerted efforts of all parties in the whole society. Through the concerted efforts of the whole society, we will promote the greening and low-carbonization of residents' lifestyles.

As the problem of global climate change has become increasingly serious, countries have strengthened measures for environmental protection and sustainable development. Among them, the Carbon GSP, as an innovative environmental protection policy, aims to promote the development of a low-carbon economy by incentivizing individuals and enterprises to reduce greenhouse gas emissions.

The implementation of a carbon preference scheme is a complex and arduous task that requires the joint efforts of the Government, enterprises and the public. By summarizing the lessons learned, we can continuously improve the carbon preference scheme, promote the sustainable

development of a low-carbon economy and make a positive contribution to combating climate change.

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