

# 2024 White Paper on Carbon Inclusion Development



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## Introduction

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On December 8, 2023, NaaS Technology Inc. (NASDAQ: NAAS) appeared at the 28th Conference of the Parties to the United Nations Framework Convention on Climate Change (COP 28) and released the 2023 White Paper on Carbon Inclusion Development (hereinafter referred to as the "White Paper"). This is the first white paper in the field of carbon inclusion in China and even the world, focusing on industrial participation and user behavior analysis. It is jointly compiled by 10 units such as NaaS, Chengdu "Tianfu Carbon Credits" platform, Wuhan "Zero Carbon together" platform and Ali Cloud. To provide guidance for sharing China carbon inclusion development and practice to the world and promoting global green and low-carbon development. On December 13, COP 28 concluded in Dubai, United Arab Emirates. The conference completed the first global inventory since the Paris Agreement, and adopted the first important decisions of concern to developing countries, such as the framework of global adaptation goals and the work plan for fair transformation paths, demonstrating the joint efforts of the international community to address climate change. During the meeting, China participated fully and in-depth consultations on various topics, closely coordinated with the UAE and other parties, firmly safeguarded the common interests of developing countries, provided solutions to key issues in the negotiations, encouraged all parties to common ground and change differences, and made important contributions to the positive outcomes of the meeting.

As an important supplement to China multi-level carbon market system, carbon inclusion is of great significance for promoting the green and low-carbon development of the whole society. The Communist Party of China Central Committee and the State Council issued guidelines to comprehensively promote the development of a "Beautiful China" on January 11, 2024, it is proposed to explore the establishment of public participation mechanisms such as "carbon inclusion". This is the first time that "carbon inclusion" has appeared in the central policy document, reflecting the importance the country attaches to the carbon inclusion benefit mechanism and the determination to promote its effective implementation. According to the latest statistics, at the local level, local governments directly mentioned 186 documents related to the carbon inclusion mechanism, 27 provinces will release the carbon inclusion mechanism as a key work, Beijing, Shenzhen, Shanghai, Tianjin, Wuhan, Chengdu and other cities have issued relevant implementation plans. The construction of carbon inclusion mechanism has risen from social appeal and urban practice to the overall layout of national and local ecological protection.

Since 2024, carbon inclusion has made significant progress in China policy level, methodology, platform construction, and carbon inclusion asset trading.

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# 01

## General overview of China carbon inclusion development

### 1.1 The policy side continues to make efforts

Policy support is the cornerstone of the development of carbon inclusion. In recent years, both at the national and local levels, policies of carbon inclusion have been introduced.

At the national level, in October and November 2022 the Chinese government has released two blockbuster reports—China's Policies and Actions for Addressing Climate Change (2022) and Progress on the Implementation of China's Nationally Determined Contributions (2022) are proposed to explore innovative voluntary reduction mechanism—carbon inclusion, motivate the society to participate in the carbon reduction. In October 2023, in order to fully reflect China policies and actions in the field of tackling climate change and demonstrate China effectiveness in its active response to climate change at home and abroad, the Ministry of Ecology and Environment prepared and released China's Policies and Actions for Addressing Climate Change (2023) in accordance with the usual practice. The report once again pointed out that the green and low-carbon national action should attract broad public participation, enhance the level of public participation in carbon inclusion, and encourage the society to participate in carbon reduction. The Communist Party of China Central Committee and the State Council issued guidelines to promote the development of a "Beautiful China" on January 11, 2024, it is proposed to explore the establishment of public participation mechanisms such as "carbon inclusion". In May 2024, the State Council issued the 2024–25 energy conservation, carbon reduction action plan, which pointed that national action should be implemented. In combination with the National Ecological Day, National Energy Conservation Promotion Week, National Low Carbon Day and other activities, we will strengthen the publicity of energy conservation and carbon reduction, advocate a simple, moderate, green and low-carbon lifestyle, and enhance energy conservation and carbon reduction for the people consciousness and ability. We should give full play to the role of the media, improve the public participation system, increase the exposure of energy waste behaviors, and create a new trend in energy conservation and carbon reduction.

At the local government level, there are 186 documents directly mentioning the carbon inclusion mechanism, and 27 provinces focusing on the release of carbon inclusion mechanism. Since 2022, Anhui, Chongqing, Hebei, Tianjin, Hubei, Zhejiang, Hainan, Shanghai, Jiangsu, Guangdong, Jiangxi, Beijing, Ningxia, Shandong and other provinces and municipalities directly under the central government, autonomous regions introduced carbon inclusion as the main body of the policy documents, Guangzhou, Qingdao, Shenzhen, Chengdu, Wuhan and other cities also according to the local economy, humanities, industrial structure is suitable for the city carbon inclusion policy, the regional carbon inclusion construction, management, standard methods and other specific areas made the rules and instructions.

Taking Chengdu as an example, in March 2020, the Chengdu Municipal People's Government issued the Implementation Opinions on Building the "Tianfu Carbon Credits", which was the first in China to propose the construction of a carbon inclusion mechanism with "Tianfu Carbon Credits" as the brand and "Public Carbon Emission Reduction Points Reward, Project Carbon Emission Reduction Development and Operation" as the dual path. In the same year, it also released the Management Measures for Tianfu Carbon Credits (Trial), Methodology for Tianfu Carbon Credits Carbon Emission Reduction Projects (First Batch), Evaluation Standards for Public Low Carbon Scenarios of the "Tianfu Carbon Credits" (Trial), and Accounting Treatment Matters Related to Carbon Emission Reduction of the "Tianfu Carbon Credits". These supporting documents have improved the methodology of carbon emission reduction, low-carbon scenario evaluation standards, and accounting procedures related to carbon emission

trading under the "Tianfu Carbon Credits" mechanism, making it more scientific and standardized. In December 2022, the Action Plan for Deepening the Construction of the "Tianfu Carbon Credits" was officially issued, further clarifying the overall requirements, main tasks, and related guarantee measures for the construction of the "Tianfu Carbon Credits" mechanism, making the goals clearer, the path clearer, and the resources richer, ensuring that the effectiveness of the mechanism construction in guiding the formation of low-carbon production and lifestyle is more obvious. Since 2023, we have focused on energy substitution, resource conservation, and ecological protection, and have released the Methodology for Carbon Reduction Projects under the "Tianfu Carbon Credits" (Second and Third Batch), which have demonstrated the economic value of environmental benefits generated by ecological construction and energy-saving carbon reduction projects.

Taking Wuhan as another example, starting from April 2023, Wuhan issued a three-year implementation plan for the construction of a carbon inclusion system, officially establishing a city level carbon inclusion system, and gradually establishing a complete carbon inclusion management supporting system, including the Wuhan Carbon Inclusion Methodology Compilation Outline released in July 2023, the Wuhan Carbon Inclusion Management Measures (Trial) released in August 2023, the Wuhan Carbon Inclusion Scenario Evaluation Specification (Trial) released in July 2024, and the establishment of the Wuhan Carbon Inclusion Expert Committee in October 2023, which provides strong support for the standardized management, methodology, and emission reduction technology evaluation of the carbon inclusion system.

Area	Policy
Shandong	"Shandong Province Carbon Inclusion System Construction Work Plan"
Tianjin	"Tianjin Carbon Inclusion System Construction Plan", "Tianjin Carbon Inclusion Management Measures (Trial)"
Guangdong	"Guangdong Carbon Inclusion Mechanism Pilot Work Implementation Plan", "Guangdong Carbon Inclusion Trading Management Measures"
Shanghai	"Shanghai Carbon Inclusion System Construction Work Plan", "Shanghai Carbon Inclusion Management Measures (Trial)"
Hebei	"Hebei Province Carbon Inclusion Mechanism Pilot Work Implementation Plan"
Hainan	"Hainan Province Carbon Inclusion Management Measures (Trial)"
Anhui*	"Anhui Province Carbon Inclusion System Construction Work Plan"
Jiangxi*	"Notice on Further Strengthening the Promotion of Carbon Inclusion Mechanisms in Public Institutions"
Chongqing*	"Management Measures for Voluntary Emission Reduction of GHG under the "Carbon Credits Platform" (Trial)"
Jiangsu*	"Management Measures for Carbon Inclusion of Public Institutions in Jiangsu Province (Draft)"
Sichuan*	"Management Measures for Forest and Grass Carbon Inclusion in Sichuan Province (Trial)"
Prefectural-level city	
Guangzhou	"Implementation Measures of Guangzhou Carbon Inclusion Voluntary Emission Reduction"
Wuhan	"Wuhan Carbon Inclusion Management Measures (Trial)", "Wuhan Carbon Inclusion Scenario Evaluation Standards (Trial)"
Chengdu	Implementation Opinions on Building the "Tianfu Carbon Credits", Action Plan for Deepening the Construction of the "Tianfu Carbon Credits", Management Measures for the "Tianfu Carbon Credits" (Trial), Evaluation Standards for Public Low Carbon Scenarios of the "Tianfu Carbon Credits" (Trial), Accounting Treatment Matters Related to Carbon Emission Reduction of the "Tianfu Carbon Credits"
Shenzhen	"Shenzhen Carbon Inclusion System Construction Work Plan", "Shenzhen Carbon Inclusion Management Measures"
Qingdao	"Qingdao Carbon Inclusion System Construction Work Plan"
Heyuan*	"Heyuan Carbon Inclusion System Construction Work Plan"
Fuzhou*	"Fuzhou Carbon Inclusion Management Measures (Trial)"
Xiamen*	"Xiamen Carbon Inclusion Management Measures (Trial)"

Table 1 Some provinces and cities that have introduced carbon inclusion policies

Source: According to the public information  
\* is marked as a new part compared to the 2023 White Paper on Carbon Inclusion Development

## 1.2 Methodology is gradually improved

Carbon inclusion methodology refers to the technical guidance document for the baseline identification, additional demonstration, emission reduction accounting and monitoring plan used to regulate carbon emission reduction projects or behaviors in specific fields. Methodology is generally divided into carbon emission reduction project methodology and scenario methodology. Carbon inclusion methodology is an important technical means to realize carbon inclusion, which is important for promoting carbon emission reduction and realizing sustainable development.

From this year, in all regions of the country, cities have continuously compiled and introduced the methodology related to carbon inclusion, On March 11, 2024, Shanghai released the Shanghai carbon inclusion emission reduction project methodology: distributed photovoltaic power generation (shcer01010012024i), Shanghai carbon inclusion emission reduction scenario methodology: ground bus (shcer02020012024i), rail transit (shcer02020022024i), internet rental bike (shcer02020032024i), residents low carbon electricity (shcer02010022024ii) and pure electric passenger vehicles (shcer02020042024ii). It covers both the project and scenario level. The introduction of methodology provides theoretical and data basis for Shanghai carbon inclusion emission reduction to enter Shanghai carbon market, and also marks the interconnection of Shanghai carbon inclusion system and Shanghai carbon market, and takes a solid step for the construction of a multi-level closed-loop absorption path of carbon inclusion emission reduction.

On November 28, 2023, Wuhan announced the first carbon inclusion methodology, including the Carbon Inclusion Methodology for Operation of Distributed Photovoltaic Power Generation Projects, Large-Scale Poultry Manure Resource Utilization, Low-carbon Electricity Consumption for Residents Based on Electricity Demand Response (Trial). It provides basis for Wuhan photovoltaic power generation, residents low carbon electricity carb on inclusion reduction projects or personal carbon reduction scenario accounting verification. On September 8, 2024, Wuhan announced the second batch of carbon inclusion methodology. This batch of methodology a total of seven, respectively for bus travel, rail transit, shared cycling travel, car-pooling, new energy vehicles travel, delivery does not use disposable tableware, idle second-hand mobile phone trading. It reflects Wuhan's comprehensive and multi-dimensional mobilization of all sectors of society to participate in carbon reduction.

On June 4, 2024, in order to promote the low-carbon development of the whole society in Yinchuan, assist in the construction of a carbon inclusion system, and promote the participation of distributed photovoltaic projects in carbon inclusion trading, Yinchuan launched the Yinchuan Distributed Photovoltaic Project Carbon Inclusion Methodology. The release of this methodology marks that in the future, any government agency, enterprise, institution, or household in Yinchuan that installs and uses distributed photovoltaic power generation systems can calculate the reduced coal consumption after using clean energy through the carbon inclusion methodology of distributed photovoltaic projects. In addition, Guangdong has revised the Carbon Inclusion Methodology for installing Distributed Photovoltaic Power Generation System and Shijiazhuang has also launched the Shijiazhuang Carbon Inclusion Methodology for Low-carbon Travel.

Area	Methodology
Guangdong	"Carbon Inclusion Methodology for Forestry Carbon Sink", "Carbon Inclusion Methodology for Installing Distributed Photovoltaic Power Generation Systems", "Carbon Inclusion Methodology for Using High-efficiency Energy-saving Air Conditioners", "Carbon Inclusion Methodology for Using Household Air Source Heat Pump Water Heaters", "Carbon Inclusion Methodology of Waste Clothing Reuse", "Carbon Inclusion Methodology for Mangrove Forests in Guangdong Province (2023 Edition)", "Carbon Inclusion Methodology for Install Distributed Photovoltaic in Guangdong Province (2024 revision)"*
Guangzhou	"Guangzhou Internet Rental Bike Cycling Carbon Inclusion Methodology (Trial)"
Shenzhen	"Shenzhen Low-Carbon Public Travel Carbon Inclusion Methodology (Trial)", "Shenzhen Residents' Low-Carbon Electricity Carbon Inclusion Methodology (Trial)", "Shenzhen Forest Management Carbon Inclusion Methodology (Trial)", "Shenzhen Efficient Refrigeration Room Carbon Inclusion Methodology (Trial)" and "Shenzhen Milk Box Recycling and Emission Reduction Carbon Inclusion Methodology (Trial)"
Hainan	"Hainan Province Mangrove Afforestation/Reforestation Carbon Sequestration Project Methodology"
Sichuan	"Carbon Inclusion Project Methodology for Conservation and Restoration of Giant Panda Habitat"
Chengdu	"Chengdu 'Tianfu Carbon Credit' Mechanism Carbon Emission Reduction Project Methodology (1-3 Batch)"
Chongqing	"Chongqing Carbon Credit Platform Methodology"
Beijing	"Beijing Carbon Emission Reduction Methodology for Low-Carbon Travel (Trial)", "Beijing Carbon Emission Reduction Methodology for Passenger Car (Oil to Electric) Travel (Trial)"
Shandong	"Shandong Province Seagrass Bed Carbon Sink Carbon Inclusion Methodology"
Qingdao	"Qingdao Low-Carbon Travel Carbon Inclusion Methodology (Trial)"
Yueqing	"Yueqing Distributed Photovoltaic Power Generation System Carbon Inclusion Methodology"
Shanghai*	"Shanghai carbon inclusion emission reduction project methodology: distributed photovoltaic power generation (shcer01010012024i)", "Shanghai carbon inclusion emission reduction scenario methodology: ground bus (shcer02020012024i)", "Shanghai carbon inclusion emission reduction scenario methodology: rail transit (shcer02020022024i)", "Shanghai carbon inclusion emission reduction scenario methodology: internet rental bike (shcer02020032024i)", "Shanghai carbon inclusion emission reduction scenario methodology: residents low carbon electricity (shcer02010022024ii)", "Shanghai carbon inclusion emission reduction scenario methodology: pure electric passenger vehicles (shcer02020042024ii)"
Wuhan*	"Carbon Inclusion Methodology for Operation of Distributed Photovoltaic Power Generation Projects in Wuhan (Trial)", "Carbon Inclusion Methodology for Large-Scale Poultry Manure Resource Utilization in Wuhan (Trial)", "Carbon Inclusion Methodology for Low-carbon Electricity Consumption for Residents Based on Electricity Demand Response in Wuhan (Trial)", "Carbon Inclusion Methodology for Bus Travel in Wuhan (Trial)", "Carbon Inclusion Methodology for Rail Transit in Wuhan (Trial)", "Carbon Inclusion Methodology for Shared Cycling Travel in Wuhan (Trial)", "Carbon Inclusion Methodology for Car-pooling in Wuhan (Trial)", "Carbon Inclusion Methodology for New Energy Vehicles Travel in Wuhan (Trial)", "Carbon Inclusion Methodology for Delivery Scene does not Use Disposable Tableware in Wuhan (Trial)", "Carbon Inclusion Methodology for Idle Second-hand Mobile Phone Trading in Wuhan (Trial) "
Yinchuan*	"Yinchuan Distributed Photovoltaic Project Carbon inclusion methodology"
Shijiazhuang*	"Shijiazhuang Carbon inclusion Methodology for Low-carbon Travel"

Table 2: the provinces and cities that have developed carbon inclusion methodology

Source: According to the public information the \* is marked as a new or modified part compared with the 2023 White paper on Carbon Inclusion Development

### 1.3 Local standards and group standards have been introduced

Local standards are approved and published by local (provincial, autonomous region, municipality directly under the central government) standardization authorities or professional supervisory departments, and are unified within a certain region. Group standards refer to standards that are independently developed and published by groups in accordance with established procedures, and are voluntarily adopted by society. Local and group standards can serve as effective supplements to carbon reduction accounting for carbon inclusion projects and scenarios, in addition to methodology. At present, the overall number of local and group standards released in the field of carbon inclusion is relatively small, especially local standards. However, from a development perspective, since 2022, different governments and group organizations have also successively introduced various standards to promote the development of carbon inclusion in local and industry areas.

In terms of local standards, in July 2024, the Beijing-Tianjin-Hebei jointly launched the "Technical Specification for Carbon Inclusion Project Emission Reduction Accounting - Low Carbon Travel" (db11/t3043-2024) local standard. This standard is the first regional low-carbon travel carbon inclusion emission reduction accounting technical document in China. The standard defines the terms and definitions of low-carbon travel in carbon inclusion project emission reduction accounting, specifies the basic requirements, greenhouse gas types, project boundaries and accounting periods, accounting methods, data monitoring and management of low-carbon travel carbon inclusion projects. The introduction of standards will be beneficial in providing technical support for relevant parties in the Beijing-Tianjin-Hebei region to carry out low-carbon travel carbon inclusion project emission reduction accounting, enhancing public awareness of participating in green low-carbon travel activities, and promoting synergistic efficiency in pollution reduction and carbon reduction in the transportation sector of the three regions.

Area	Local standard
Beijing-Tianjin-Hebei	"Technical Specification for Carbon Inclusion Project Emission Reduction Accounting - Low Carbon Travel" (db11/t3043-2024)
Jiangxi	"Technical Specification for Construction of Carbon Inclusion Platform" (db36/t1476-2021) and "Operational Management Specification for Carbon Inclusion Platform" (db36/t1477-2021)
Huzhou	"Carbon Inclusion - Pure Electric Vehicle Travel Carbon Emission Reduction Accounting Specification", "Carbon Inclusion - Roof Distributed Photovoltaic Power Generation Carbon Emission Reduction Verification Specification "

Table 3 shows the provinces and regions that have developed local standards for carbon inclusion Source: According to the public information collation

In terms of group standards, by Shandong Nenglian Holdings Co., Ltd., Beijing Green Exchange co., LTD., China Standardization Institute Resources and Environment Research Branch, China Quality Certification Center and other units jointly drafted the "Technical specification for carbon emission reduction assessment of digital fueling method - Fuel vehicle" group standard, through the digital refueling way of carbon emission reduction, emissions calculation standardized mathematical model, fill there is no open applicable digital refueling way of carbon reduction accounting system. According to calculations, refueling through online apps such as TuanYou can reduce the average waiting time for the rear car by 2 minutes per refueling session, and achieve a reduction of approximately 7.6g in carbon emissions. In addition, organizations such as the All-China Environmental Federation, China Energy Conservation Association, and China Circular Economy Association have successively released carbon inclusion group standards that include green travel, no need for disposable tableware, and trading of idle items.

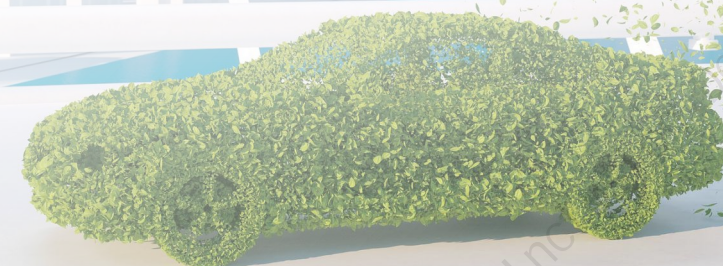
### 1.4 Carbon inclusion platform blooming all over the country

In the 2023 White Paper on Carbon Inclusion Development, it is proposed that the current mechanism of China carbon inclusion platform can be roughly divided into carbon inclusion platform for the public, carbon inclusion platform for internal employees, and typical carbon account application platform for enterprise users. At present, the most widely promoted and most commonly used is the first carbon inclusion platform for the public. Most of these platforms are established in areas with more developed urban economy or more perfect local environmental protection work, and are basically promoted and established by the ecological environment bureau of the local government, with a wide coverage of carbon inclusion scenarios. At present, the carbon inclusion platform led by local governments for the public is blooming across the country. In terms of geographical location, in northeast China, on June 25, 2024, Harbin Carbon inclusion Platform was officially launched, marking the official completion of the first carbon inclusion platform in the three northeastern provinces. In North China, Beijing "Green Life Season" platform, Shanxi "Sanjin Green Life" platform, Tianjin "Jintanxing" Platform, Qingdao "Qingtanxing" platform and Erdos "Nuanchengtanhui" Platform have also been launched and open to the public. Residents can participate in green lifestyles such as green travel and recycling. In east China, Shanghai "Suishenxing" platform, Shanghai Huangpu carbon inclusion platform, Wuxi "Carbon Fashion" platform, "Zhejiang Carbon Inclusion" platform, Jiaxing carbon inclusion platform, Jiangxi carbon inclusion platform – " Jiangxi Low-carbon Life ", Hefei carbon inclusion platform – "Tanhuiluzhou" are also helping and leading the public in East China to live a green life. In central China, Wuhan carbon inclusion platform "Zero Carbon together" has been launched on June 9, 2023, "Zero Carbon together" a feature is its rich emission reduction scenario and rigorous emissions calculation, and the user in these scenarios of emissions are calculated by Wuhan Ecological Environment Bureau for the record methodology, and relying on block chain technology issued online real-time, can be used to exchange gifts or participate in carbon trading. In southern China, the online platforms include Guangzhou Carbon inclusion Platform, Shenzhen Carbon inclusion Platform – Low-carbon Planet, and Guangxi "Guitanbao" mini program". In southwest China, Chengdu "Tianfu Carbon Credits" platform, as the first platform in China featured by the dual-path carbon inclusion mechanism of "credits for public carbon emission reduction and development and operation of carbon emission reduction for projects" was launched since May 2021, more than 3 million Chengdu citizens involved in green travel, "Clear Your Plate" campaign, garbage recycling and other green way of life. In addition, there are Chongqing Carbon Credit Platform, Luzhou "Green Bud Point" platform. In northwest China, Ningxia and Xinjiang – "Lvjiangtanhui". In Hong Kong, Macao and Taiwan, Macaos carbon inclusion mini program was launched in May 2023, allowing Macao residents to easily achieve carbon emission reduction targets in their daily life and jointly support Macaos environmental protection.

From the perspective of the quantity and quality of regional carbon inclusion platforms, the economy, population and carbon emission exchanges have become the key factors leading the development of carbon inclusion platforms. Regions with relatively developed economy have developed well. For example, in East China, the Yangtze River Delta region has strong economic strength, which has a strong supporting role for the incentive mechanism of carbon inclusion. Therefore, this region has become the region with the largest relative density of carbon inclusion platform in China. In addition, areas with relatively concentrated population are also conducive to the development of carbon inclusion. In southwest China, taking Chengdu, for example, due to the strategy of strong provincial capital, the population has been flowing in recent years, and the population has exceeded

21.4 million. The number of "Tianfu Carbon Credits" platform has exceeded 3 million, and 38 kinds of online low-carbon scenarios have been built. Chongqing, with a population of nearly 32 million, currently has nearly 2 million participants in the Chongqing Carbon Credit Platform. In addition, carbon emissions trading market has also become one of the most critical factors for regional or urban carbon inclusion development, because it depends on whether carbon inclusion emission reduction becomes an effective supplement to local carbon emission reduction beyond CEA and CCER, and whether the closed loop of carbon inclusion emission reduction can be completed. As can be seen from Table 4, China's first batch of 7 provinces and cities to launch the pilot work of carbon emission trading, including Beijing, Tianjin, Shanghai, Chongqing, Hubei (Wuhan), Guangdong (Guangzhou) and Shenzhen have all completed the construction of the carbon inclusion platform.

Platform	Region
<b>Northeast China</b>	
Harbin Carbon Inclusion	Harbin
<b>North China</b>	
Green life Season	Beijing
Sanjin Green life	Shanxi
Jintanxing	Tianjin
Nuanchengtanhui	Erdos
Qingtanxing	Qingdao
<b>Eastern China</b>	
Suishenxing	Shanghai
Shanghai Huangpu District Carbon Inclusion Platform	Shanghai
Zhejiang Carbon Inclusion	Zhejiang
Carbon Fashion	Wuxi
Jiaxing Carbon Inclusion Platform	Jiaxing
Jiangxi Low-carbon life	Jiangxi
Tanhuiluzhou	Hefei
Jiangsu Public Institution Carbon Inclusion Management Information Platform	Jiangsu





Platform	Region
<b>Central China</b>	
Tanhuihuangshi	Huangshi
<b>South China</b>	
Guangzhou Carbon Inclusion	Guangzhou
Low-carbon planet	Shenzhen
Guitanbao	Guangxi
<b>Southwest</b>	
Tianfu Carbon Credits	Chengdu
Chongqing Carbon Credit Platform	Chongqing
Green Bud Point	Luzhou
<b>Northwest</b>	
Ningxia Carbon Inclusion Platform	Ningxia
Lvjiangtanhui	Xinjiang
<b>Hong Kong, Macao and Taiwan</b>	
Macau Carbon Inclusion Platform	Macao

Table 4 Combing of major carbon inclusion platforms in different regions of China

Source: According to the public information

### 1.5 Carbon inclusion cooperation organization

Carbon inclusion cooperation organization is a cooperative consortium voluntarily formed by government departments, enterprises, social organizations, scientific research institutions and other parties to jointly promote the development of carbon inclusion. Such organizations are usually oriented towards carbon peaking and carbon neutrality, and are committed to integrating resources from all parties and carrying out in-depth cooperation in carbon rule formulation, standard construction, technology research and development, platform operation, publicity and promotion. At present, there are relatively few carbon inclusion cooperation organizations established in China, including Carbon Inclusion City Cooperation Alliance and Carbon Inclusion Cooperation Network.

On July 20, 2024, in Hubei carbon market opened the tenth anniversary of the theme activities, China Carbon Emissions Registration and Clearing Co., Ltd. (CRC) China Hubei Carbon Emission Exchange, Wuhan Carbon Inclusion Management Co., Ltd and Tencent, Beijing, Shanghai, Guangzhou, Shenzhen and other cities of carbon inclusion practitioners, jointly launched "Carbon Inclusion City Cooperation Initiative", and set up Carbon Inclusion City Cooperation Alliance. The first batch of members of Carbon Inclusion City Cooperation Alliance includes 32 companies such as NaaS Technology Inc., Alipay, Didi and China Merchants Bank, covering carbon inclusion managers, carbon inclusion platform operators,

low-carbon scenario enterprises and low-carbon incentive providers. The alliance aims to unite the builders and participants of different types of carbon inclusion models, integrate the resources of the alliance member units in the market, technology, talent and other aspects, and build a carbon inclusion cooperation mechanism with strong appeal, wide influence and sustainable operation. The establishment of the Carbon Inclusion City Cooperation Alliance marks an important step forward in exploring the carbon inclusion mechanism, and will provide strong support for local cities to guide the public to participate in tackling climate change with the help of carbon inclusion mechanism.



Figure 1.1 List of the first members of Carbon Inclusion City Cooperation Alliance

On June 15, 2022, the "Carbon Inclusion Cooperation Network" was jointly initiated by the Publicity and Education Center of the Ministry of Ecology and Environment, the All-China Environmental Federation, China Internet Development Foundation, the International Cooperation Center of the National Development and Reform Commission, and the China Ecological Civilization Research and Promotion Association. The "Carbon Inclusion Cooperation Network" is a voluntary, non-profit collaboration mechanism. "Carbon Inclusion Cooperation Network" will use the cooperation mechanism, in carbon inclusion research, publicity and education, pilot demonstration, close cooperation, standards, etc, and actively make recommendations, to promote the national carbon inclusion work play a promoting role, build green living social atmosphere, inspire the green low carbon life enthusiasm, power green low carbon development.



# 02

## Carbon inclusion asset trading



## 2. Carbon inclusion asset trading

On April 22, 2024, Jiangxi Provincial Department of Ecology and Environment issued an announcement on soliciting opinions on the “Notice on Launching Pilot Projects for Voluntary Greenhouse Gas Reduction in Jiangxi Province (Draft)”, which means that Jiangxi province will soon establish a local voluntary emission reduction market. It is expected that by 2030, Jiangxi provinces voluntary greenhouse gas emission reduction will reach more than 10 million tons. More than 6 voluntary greenhouse gas emission reduction methodologies have been released in the fields of ecosystem carbon sequestration, agricultural and rural carbon reduction and fixation, industrial pollution reduction and carbon reduction, public low-carbon behavior (carbon inclusion), resource conservation and recycling, energy conservation and renewable energy utilization in Jiangxi Province, promoting the formation of green and low-carbon production and lifestyle.

Local voluntary emission reduction market is the prerequisite for the development of carbon inclusion emission reduction. Without a complete local voluntary emission reduction market, it is impossible to establish a sound carbon inclusion emission reduction mechanism and form a closed loop of carbon inclusion emission reduction trading. It can also be seen from the existing trading results of carbon inclusion emission reduction that the basic trading cases that can be formed in China are also in nine regional carbon emission trading markets in China, such as Guangdong, Shenzhen, Chongqing, Wuhan, Hubei, Chengdu, Sichuan, etc.

In terms of the trading and application of carbon inclusion emission reduction, good progress has been made since the release of the White Paper last year due to the continuous policy support and the continuous introduction of relevant methodology. In addition to the trading in Shenzhen, Beijing, Guangzhou and other places introduced last year, this year, Shanghai, Wuhan, Chongqing, Guangdong Zhaoqing, Zhongshan and other places have also had projects and scenarios of carbon inclusion emission reduction into the carbon emission exchange for trading. For some cities without a carbon emission exchange, the subscription of carbon offset between enterprises has gradually become one of the means to achieve the closed-loop trading of carbon inclusion emission reduction. In terms of carbon neutrality for large-scale activities, as relevant policy documents have been issued successively to promote the implementation of carbon neutrality for large-scale activities (see Table 5), carbon inclusion emission reduction as an important supplement to CEA and CCER has been widely applied to the offset of carbon neutrality for various large-scale activities. In addition, in terms of "carbon compensation" to help ecological restoration, it is also an innovative attempt of carbon inclusion assets to offset through carbon inclusion emission reduction.

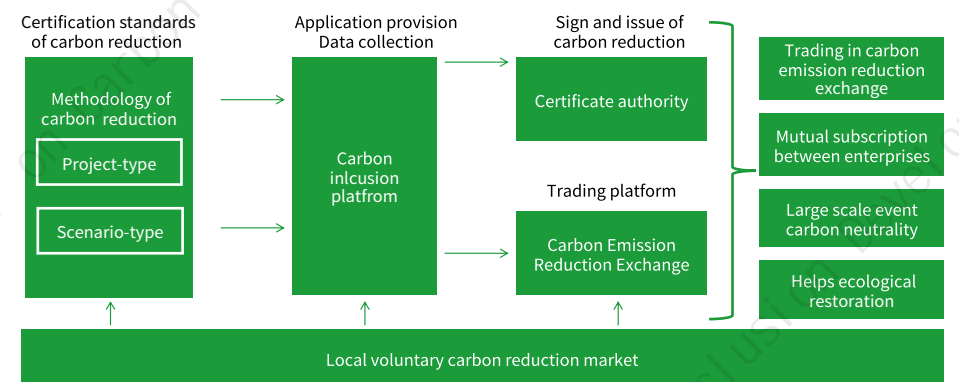


Figure 2.1 Trading process

Taking Chengdu as an example, Chengdu "Tianfu Carbon Credits" mechanism certified carbon emission reduction can be traded through listing selection, bidding trading, agreement transfer and other trading methods. By October 2024, 129 carbon emission reduction projects had been developed, and about 639,000 tons of carbon emissions reduction were reviewed and registered. From 2020 to 2024, the number of carbon emission reduction projects under the "Tianfu Carbon Credits" mechanism will increase year by year, and enterprises and institutions will be guided to develop carbon emission reduction according to methodologies, making green and low-carbon environmental benefits present economic value, and driving the practice of green and low-carbon production methods.

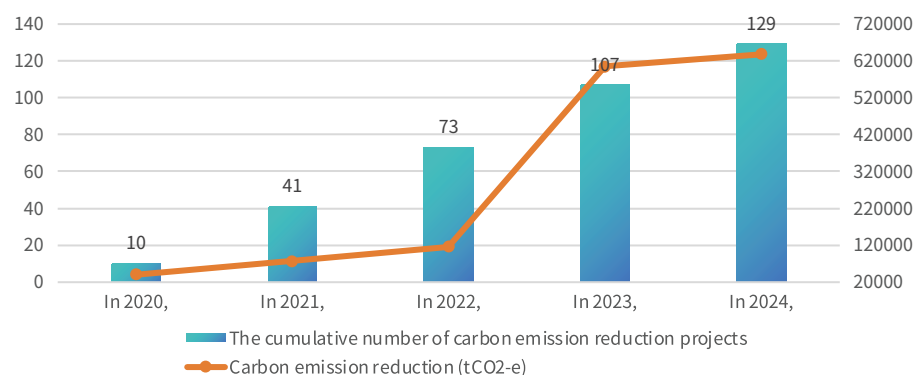


Figure 2.2 Number of carbon emission reduction projects under the "Tianfu Carbon Credits" mechanism in 2020–2024

Source: provided by "Tianfu Carbon Credits" platform

The "Tianfu Carbon Credits" mechanism in Chengdu actively applies carbon emission reduction to carbon offset, and the consumption side mainly includes large-scale event organizers, conference organizers, social responsible enterprises and pilot units of near-zero carbon emission zone. As of November 2024, Sichuan Faw Toyota Motor Co., Ltd., Industrial Bank Co., Ltd Chengdu Branch and more than 200 enterprises use CDCER to participate in carbon neutrality, the first China Digital Carbon Neutrality Summit Forum and other activities use CDCER to achieve the carbon neutrality of public activities 6455 times. Among them, 392 carbon neutral conferences were held, with a total consumption of 5503.686 tons. The accumulated carbon emissions reduction exceeded 460,000 tons, and the subscribed funds were nearly 1.4 million yuan, realizing the value conversion of environmental benefits generated by ecological construction, energy conservation and carbon reduction in enterprises and institutions.

## 2.1 Carbon inclusion assets trading in the carbon emissions exchange

On December 25, 2023, Wuhan Sanzhen Industrial Holding Co., Ltd., a controlled emission enterprise, purchased 7,609 tons of carbon inclusion emission reduction from two enterprises outside the carbon market to offset part of its carbon emissions. This is the first single carbon inclusion trading since the establishment of Hubei Carbon Emission Exchange. The carbon inclusion emission reduction of this transaction comes from two projects, namely the photovoltaic power generation project of Wuhan Gelinmei City Mineral Recycling Industrial Park and the distributed photovoltaic project of Wuhan Rixin Solar. Approved and verified by the third-party certification body, the carbon inclusion emission reduction of the two projects is 7,609 tons of carbon dioxide.

On September 23, 2024, the Promotion Conference for Distributed Photovoltaic Carbon Inclusion Development in Wuhan, Hubei Province was held at Wuhan Zhongtangdeng Building. State Grid Wuhan Power Supply Company Wuhan Electric Carbon Finance Center (Green Power Green Certificate Service Center) and Hubei Zhongtangdeng Asset Management Co., Ltd. have completed the first batch of Hubei carbon inclusion emission reduction development and acquisition contracts for 2024. At the site of the promotion meeting, Yangluo Port distributed photovoltaic carbon inclusion emission reduction acquisition first signed – Hubei Zhongtangdeng Asset Management Co., Ltd. to acquire the full amount of Yangluo Port distributed photovoltaic project one year emission reduction of 634 tons. This is also the first distributed photovoltaic carbon inclusion emission reduction transaction signing in Hubei province this year. This cooperation will not only inject new impetus into the green development of Yangluo Port, but also set a new benchmark for the development of carbon inclusion projects in Wuhan city and even the whole country. In view of the low trading price of carbon inclusion emission reduction, this offset mechanism can effectively reduce the performance cost of emission controlled enterprises after opening with the carbon market, and at the same time provide "carbon benefit" for carbon inclusion project developers, forming a closed loop of incentive carbon inclusion system.

At the same time, since the release of the second batch of carbon inclusion methodology in Wuhan, Wuhan has actively promoted the "distributed carbon account" mode, taking third-party service platforms such as Didi, Kuaidian and Alipay Ride Code as the collection tool for personal carbon emission reduction, and rapidly accumulating emission reduction with the help of its huge user base. It is expected that by the end of 2024, 3,000 tons of individual carbon inclusion emission reductions will be traded in the carbon market in this way. These platform companies have pledged to use carbon revenue to feed their low-carbon users to form a sustainable, market-oriented and benign closed loop.

On September 13, 2024, SHCERCIR1, a voluntary greenhouse gas emission reduction trading product, was officially put into operation in Shanghai Environment and Energy Exchange. On the morning of the same day, the park distributed photovoltaic power generation carbon inclusion emission reduction project jointly developed by Lingang Green Innovation Company and Lingang Hongbo Company successfully completed the first voluntary greenhouse gas emission reduction trading in Shanghai. Among them, Shanghai Metro New Energy Co., Ltd., a wholly-owned subsidiary of Shanghai Shentong Metro Co., Ltd., sold 416 tons of carbon dioxide emission reductions approved for the Shanghai Metro Sanlin Base Photovoltaic Project through bidding on the Shanghai Environment and Energy Exchange. The final transaction price was 65.88 yuan/ton, with a total transaction amount of 27,406.08 yuan.

In March 2024, the Chongqing Urban Public Transport Vehicle Travel Greenhouse Gas Emission Reduction Project, developed by Chongqing Transportation Development Investment Bus Group Yiman New Energy Company, completed the first voluntary emission

reduction transaction for the Chongqing "Carbon Inclusion Platform" project at the Chongqing Carbon Emission Trading Center, with a trading volume of over 6 million yuan and a greenhouse gas emission reduction of approximately 167000 tons. This transaction is also the first voluntary emission reduction transaction for low-carbon public transportation certification in China.

On September 20, 2024, in Guangdong Province, 107 villages in 13 towns of Guangning County, Zhaoqing City, successfully bid for the forestry carbon sink carbon inclusion project at a transaction price of 36.5 yuan/ton, selling 145800 tons of carbon inclusion certified emission reductions. This marks the completion of the ecological value trading and realization of the mountains and forests in Guangning, directly bringing a total economic benefit of about 5.32 million yuan to each village collective. In March 2024, Yujia Rinsing Co., Ltd. in Shunde District, Foshan City applied for a distributed photovoltaic power generation carbon inclusion project, which was approved by the Guangdong Provincial Department of Ecology and Environment for a total of 4937 tons of emission reduction in 2 years. It successfully bid at the Guangzhou Emissions Exchange and became the "first" carbon inclusion trading project in Jun'an Town, with a transaction price of 40 yuan per ton. On January 24, 2024, the first batch of carbon inclusion certified emission reductions in Zhongshan City were traded through bidding, with a total of 68 project owners participating in the transaction at a price of 65.01 yuan/ton. A total of 4618 tons were traded, generating a trading income of 300216.18 yuan, which was obtained through bidding by Hwabao Securities Co., Ltd. The trading entities include 55 households, giving birth to the first batch of individual "carbon sellers" in Guangdong Province.

## 2.2 Mutual subscription between enterprises

In June 2024, the carbon emission reduction trading project of Jiaxing Haining Tongcheng Construction and Development Co., Ltd. was successfully bidding on Jiaxing Carbon Inclusion Platform. All 8082.9 tons of carbon emissions were sold by Haining Xinye New Materials Technology Co., Ltd with a total transaction price of more than 670,000 yuan. Up to now, the transaction volume of Carbon Inclusion Platform has reached 9770.9 tons, with the amount of more than 800,000 yuan. In January 2024, Jiaxing Carbon Inclusion Platform was officially launched, making quantitative accounting of the green carbon reduction behavior of government organs, enterprises, institutions, social organizations, other social organizations and individuals. After the project emission reduction is issued by the ecological environment department, it can participate in the trading through listing and agreement transfer through the carbon inclusion platform. However, in the absence of carbon inclusion platform, the low-carbon production and living behaviors of all walks of life could not be developed as carbon assets, and there was no channel to enter the carbon market trading. With the help of the carbon inclusion platform, carbon emissions are transferred to the carbon trading market through the carbon inclusion certification. Through a series of processes such as seller listing, interested party registration, bidding, buyer purchase, and result announcement, more economic and social benefits can be generated.

On August 21, 2024, Zhangjiagang Yuntong New Energy Equipment Co., Ltd., through Suzhou One-stop Carbon Neutrality Inclusion Service Center purchased 10 tons of carbon emission reductions from Suzhou Public Transport Group, marking the successful completion of the country's first carbon inclusion charging transaction. New energy vehicles are an important emission reduction scenario in the carbon inclusion system. As of the end of June 2024, the total number of new energy vehicles in China reached 24.72 million, including 18.134 million pure electric vehicles

Electric vehicles use electricity as their energy source and have low-carbon and environmentally friendly green attributes compared to fuel vehicles. According to the "Methodology for Carbon Inclusion Charging of Special Vehicles", Suzhou Public Transport Group has conducted carbon asset verification on the first batch of 13 bus charging stations. Based on a total charging capacity of 130 million kWh, the carbon emission reduction that can be issued is approximately 56000 tons.

In April 2024, Sichuan Shinan Construction Engineering Co., Ltd. located in Chengdu, purchased 200 tons of carbon reductions from Zhangjiagang Xingwei Optoelectronics Technology Co., Ltd. through the Suzhou "Carbon Inclusion" platform at a price of 20 yuan/ton. This was the first cross provincial transaction on the Suzhou "Carbon Inclusion" platform.

## 2.3 Carbon neutrality and carbon offset for large-scale activities

Since 2024, Wuhan "Zero Carbon Together" platform has launched a series of "Crowdfunding for carbon neutrality" low-carbon activities, to guide citizens to donate personal emission reduction to various activities and public welfare projects. In this way, the concept of carbon neutrality is gradually penetrated into the daily life of citizens. Up to now, they have successfully helped the organizers of more than 10 activities, including Wuhan Marathon, Zhongtandeng Building, 2024 Two Lakes Forum, 2024 China Carbon Market Conference, "Fish in the Yangtze River" public welfare project, 2024 Environment Day and citizen wedding, to achieve the goal of "carbon neutrality".

From September 20 to 22, 2024, under the joint guidance of Guangzhou Municipal Bureau of Commerce and Guangzhou Municipal Bureau of Ecology and Environment, the first carbon neutral exhibition of domestic pet industry—2024 Hongwei World Pet Expo was held in Guangzhou Poly World Trade Expo. This exhibition actively carries out various carbon reduction work, such as paperless implementation of over 90% of tickets, manuals, etc., 95% of exhibition layout using recyclable materials, and the development of green exhibition guidelines. At the same time, accounting for the greenhouse gas emissions generated by the net purchase of electricity, transportation of attendees, and catering throughout the entire cycle of the exhibition. Finally, by purchasing voluntary emission reductions such as Guangzhou Carbon Inclusion, the carbon emissions generated by this exhibition were offset, achieving the goal of carbon neutrality at the exhibition.

The "Comprehensive Promotion of Beautiful China Construction" 2024 Luzhou Environment Day event, hosted by the Office of the Luzhou Ecological Environment Protection Committee, was held on June 3 at Sichuan Chemical Vocational and Technical College. At the event, the "Green Bud Point" mini program in Luzhou City launched a new function called "Large scale Event Carbon Neutrality", which reduces emissions through the "Green Bud Point" carbon inclusion project and helps achieve carbon neutrality for large-scale events. This project relies on the carbon emission calculator of the All-China Environmental Protection Federation for accounting, and was registered with the Sichuan Provincial Department of Ecology and Environment in May this year, marking the first time that Luzhou City has achieved large-scale event carbon neutrality.

On May 9, 2024, Ningyang Square of Yinchuan Xinhua Department Store Commercial Group Co., Ltd. purchased 39 tons of Yinchuan Carbon Inclusion Certified Emission Reductions from the Yinchuan "Six Rights" Reform Integration Service Platform to offset the carbon

emissions generated by the "Fuyou Dongfang Yinchuan Year" activity. This is the first carbon inclusion trading in Xixia District, Yinchuan, and also the first application of carbon emission reductions in the "Clean Heating" ecological value realization project led by the Yinchuan Ecological Environment Bureau for activity carbon neutrality. It has set an excellent demonstration for the application of Yinchuan Carbon Inclusion Certified Emission Reductions in personal carbon neutrality, enterprise carbon neutrality and other fields.

On June 5, 2024, the opening ceremony of the 2024 Beijing CBD Forum and the first Beijing CBD Multinational Corporation Conference were held in Chaoyang District. The Beijing CBD Forum has been successfully held for 24 sessions and is a landmark brand event for the capital to promote the construction of an international communication center. It has also become an international high-level dialogue platform for Beijing's opening up to the outside world. The Beijing Energy Conservation and Environmental Protection Center proposed multiple measures to reduce carbon emissions during the preparation and organization of the forum, and helped the forum achieve carbon neutrality through carbon donations. At the opening ceremony, witnessed by more than 400 guests from national ministries, relevant departments of Beijing, embassies in China, international organizations, and domestic and foreign enterprises, Zhang Wangcai, Secretary and Director of the Party Committee of Beijing Energy Conservation and Environmental Protection Center, presented the forum carbon neutrality certificate to the Beijing Business Center Management Committee. The forum commissioned a professional organization to calculate the total greenhouse gas emissions generated during the preparation, hosting, and closing stages of the conference, totaling 138.25 tons of carbon dioxide equivalent. The Management Committee of Beijing Business Center District, together with Beijing Energy Conservation and Environmental Protection Center and Ele.me, worked together to offset the emission reduction donations verified by Ele.me on the Beijing Green Life Platform, ultimately achieving a "carbon neutral conference".

Area	Policy	Release unit and time
Nationwide	Implementation Guidelines for Carbon Neutrality in Large-scale Events (Trial)	Ministry of Ecology and Environment: May 29, 2019
Shandong	Guidelines on promoting the carbon neutrality of large-scale activities in Shandong Province	Shandong Provincial Department of Ecology and Environment: January 2, 2023
Fujian	Implementation Plan for Large-scale Events and Business Conference in Fujian Province (Trial)	Fujian Provincial Department of Ecology and Environment: December 16, 2021
Shanxi	Implementation plan of carbon neutrality for large-scale activities in Shanxi Province	Shanxi Provincial Department of Ecology and Environment: January 05, 2023
Hebei	Carbon neutrality evaluation standards for large-scale events DB 13 / T 5560-2022 (Local standard)	Hebei Provincial Administration for Market Regulation: May 31, 2022
Beijing	Guidelines for the implementation of carbon neutrality for large-scale activities in Beijing DB11 / T 1862-2021	Beijing Municipal Bureau of Market Supervision: June 22, 2021
Shaanxi	Guidelines for carbon neutral implementation for large-scale activities in Shaanxi Province	Shaanxi Provincial Department of Ecology and Environment: May 15, 2024
Hainan	Notice on the issuance of the Guiding Opinions on Encouraging Carbon neutrality for Large-scale Activities in Hainan Province	Hainan Provincial Department of Ecology and Environment: February 29, 2024
Chengdu	Implementation Plan for Guiding and Standardizing Carbon Neutrality Public Welfare Actions in Chengdu (Draft)	Chengdu Municipal Bureau of Environment and Bureau: October 2024
Shenzhen	Implementation Plan for Large-scale Activities in Shenzhen	Shenzhen Municipal Bureau of Ecology and Environment: March 1, 2024
Yinchuan	Implementation Plan of Carbon neutrality for Large-scale Activities in Yinchuan City (Trial) (Draft)	Yinchuan Municipal Bureau of Ecology and Environment : September 2024

Table 5: Some provinces and cities that have introduced carbon-neutral policies for large-scale activities

Source: According to the public information

## 2.4 "Carbon compensation" to help ecological restoration

In September 2024, Xiaojiang Forest Farm in Xinchang County, Zhejiang Province sold a total of 400 tons of carbon sink of Zhejiang Carbon Inclusion (forestry carbon sink) certified emission reduction project through Zhejiang (Lishui) Ecological Product Trading Platform, with a transaction amount of 40,000 yuan. It is reported that this is the first carbon sink trade used to replace ecological compensation for environmental damage. The carbon offset carbon trading this time is based on the carbon sink amount developed by the Xinchang Forest Management (Carbon Inclusion) Project in 2023, which is an innovative exploration for Xinchang County to build a carbon sink pilot base. It opens up a path for future carbon sink trading and provides new ideas for combating forest resource destruction, ensuring timely and effective compensation for damaged forest ecology and serving as a demonstration for the monetization and income generation of the county's vast forest resources.

In May 2023, a electroplating company in Zhongshan City was investigated and punished for excessive discharge of wastewater. After appraisal and evaluation, the company's two excessive discharges of wastewater caused a total of 70344 yuan in ecological and environmental damage. Due to the irreparable damage, the liable party for compensation completed the alternative repair compensation by purchasing 1019 tons of carbon inclusion certified emission reductions (PHCERs) from the distributed photovoltaic power generation project of Zhongshan Liangyi Lighting Co., Ltd. and voluntarily offsetting them.

In May 2022, a rotary drilling rig used by a construction labor company in Shenzhen was investigated and punished for its unqualified exhaust emissions. After evaluation, the total value of ecological and environmental damage caused by the incident is 24502.5 yuan. The compensation obligor has completed alternative remediation by purchasing carbon inclusion certified emission reductions through the Shenzhen Carbon Emissions Spot Trading System and offset them.



# 03

## Carbon inclusion public participation analysis



### 3. Carbon inclusion public participation analysis

The analysis of carbon inclusion public participation will be carried out from three dimensions: awareness of carbon inclusion, participation in various scenarios, and equity exchange.

#### 3.1 Research and analysis of public carbon inclusion awareness

In order to fully investigate and analyze the willingness and form of the public to participate in carbon inclusion activities, a wide range of public awareness of carbon inclusion research was carried out. This survey, A total of 1,085 valid questionnaires were collected, In keeping last years main problems such as whether heard of carbon inclusion concept or participated in the activities of carbon inclusion, through what way to participate in the activities of carbon inclusion, participated in the activities of which carbon inclusion scene, carbon points for what items, carbon inclusion how to improve personal and social low carbon consciousness and action, the government and enterprises should mainly how to strengthen the promotion and application of carbon inclusion, It also increases the age of public participation, gender, channels to understand carbon inclusion, whether we have heard of blockchain, WEB 3, AI and other new digital technologies in the field of carbon inclusion, how much value of 1kg carbon inclusion emission reduction should be, and other issues, Make the scope and data of this survey more extensive and representative.

According to the survey on the age of public participation, 45 percent of users were between 31 and 45, 30 percent of users were between 18 and 30, 23 percent of users were between 46 and 60, while only 3% and 1% were those under 18 and over 60. This means that the current participants of carbon inclusion are mainly young and middle-aged. These groups have a high degree of understanding of intelligence and digitalization, and are also willing to understand, accept and participate in activities related to carbon inclusion. However, students under 18 years old are mainly students, and their living places are mainly families and schools, and the main time and energy are in learning. People over 60 years old have some difficulties in getting access to carbon inclusion, so they occupy a relatively low proportion in this survey.

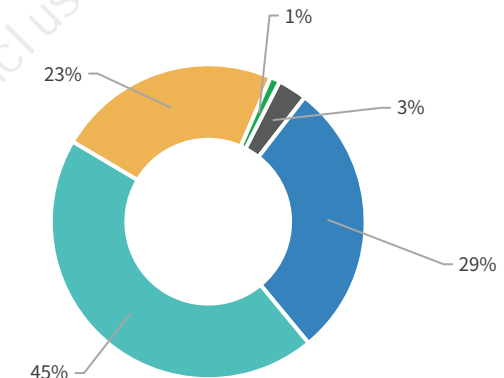


Figure 3.1 Age distribution statistics of participants in the survey

Figure 3.1 Age distribution statistics of participants in the survey

[1] Considering that this questionnaire survey is an online survey, the survey results may deviate from the actual results.

In the gender statistics of public participation, 55.5% were female users, and 44.5% were male users, while the others accounted for 0%. It shows that the current female users in China are more willing to participate in the research and activities of carbon inclusion.

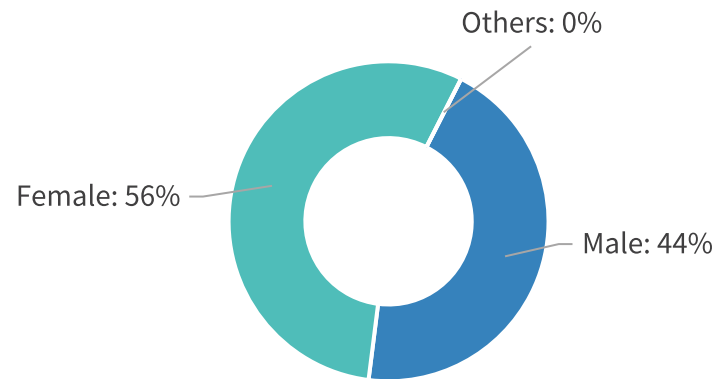


Figure 3.2 Statistics on the gender distribution of the public participating in the survey

In whether heard of "carbon inclusion" concept or participated in the activities of carbon inclusion, 80% of users have heard or participated in the carbon inclusion related activities, compared with last year 53% proportion has increased, on the one hand, the research user groups more accurate this year, on the other hand, the development of carbon inclusion in China has rich achievements recently. For 20% of users who have not heard the concept and participated in related activities of carbon inclusion, the joint efforts of all roles under the mechanism are needed to popularize the concept of carbon inclusion to more public.

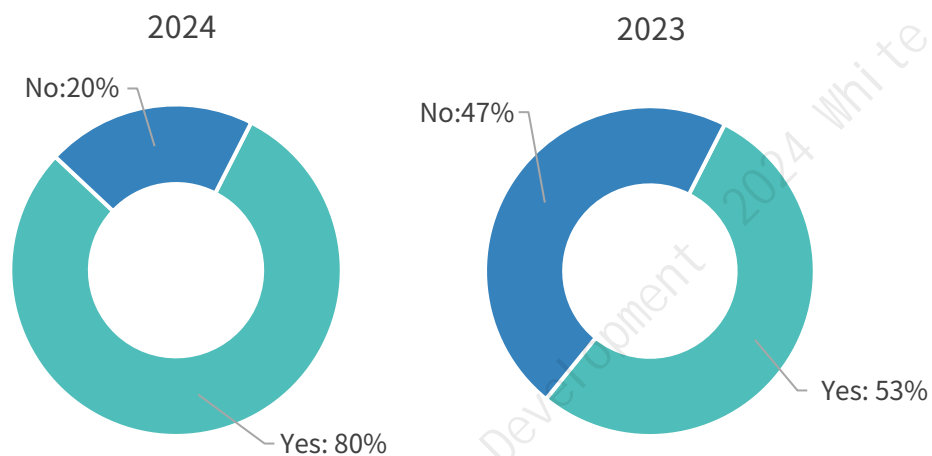


Figure 3.3 Statistical results of Have you heard the concept of "carbon inclusion" or participated in related activities

Among the questions about how to learn about the concept of carbon inclusion, 57.5% were through social network, 54% through news media, 24.5% through enterprise promotion, 19% through government promotion, 7% of users through school education and other channels accounted for 23%. This also shows that the current dissemination route of carbon inclusion is mainly social network and news media, while enterprises, government, schools and other organizations need to increase their publicity efforts.

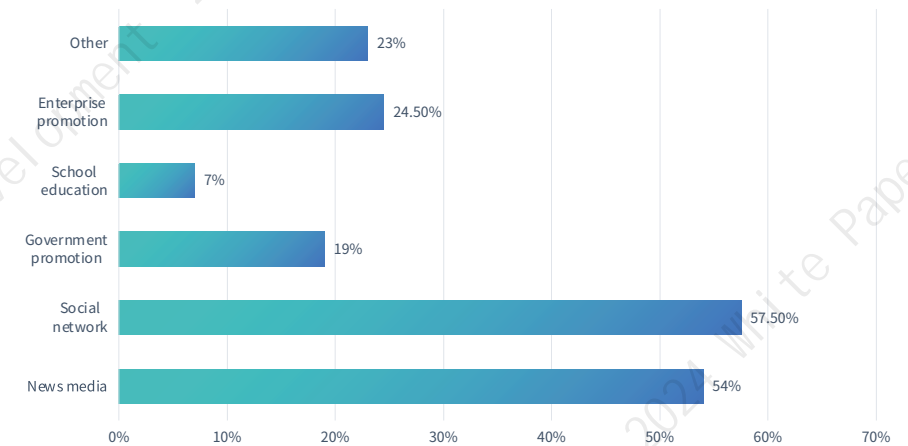


Figure 3.4 Statistical results of which channels to access the concept of carbon inclusion [2]

In the question of which ways to participate in carbon inclusion activities, 80% of users participated through App, and 57.5% of users participated through mini programs. App option increased by nearly 30% compared with 51% last year, and the participation in mini programs also increased by nearly 20% compared with 39% last year. It shows that over the past year, both enterprise-led carbon accounts and government-led carbon inclusion platforms have greatly increased in number and activity. This survey showed that the proportion of users participating in offline activities accounted for only 15%, up 5% compared to last year. In the future, all platforms and enterprises should increase more offline publicity and activities related to carbon inclusion, especially for the elderly groups with low utilization rate of smart phones, and should hold carbon inclusion related activities in local communities.

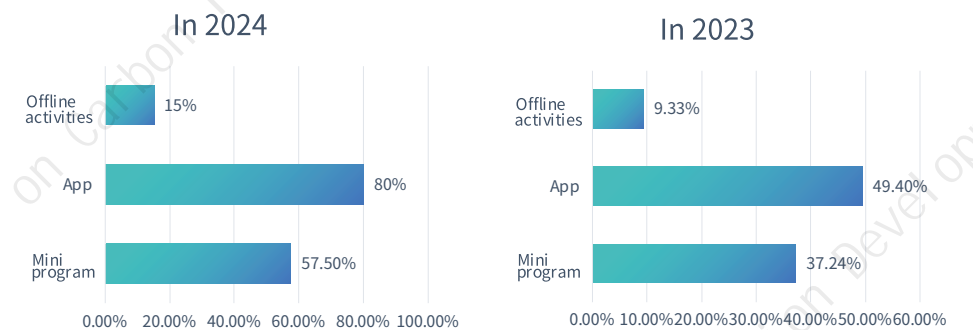


Figure 3.5 Statistical results of participating in carbon inclusion activities by what means [3]

[2] [3] This question is a multiple-choice question. The percentage of multiple-choice options = the number of times the option has been selected ÷ the number of valid answer sheets

In the survey of how difficult it is to participate in the current carbon inclusion platform or activity, 40% of users think it is easy, 43% of users choose generally, and 17% of users think it is difficult. It is believed that the proportion of easy has increased by 12% compared with last year, while the proportion of general and difficult has decreased, indicating that the overall reach rate of China carbon inclusion platforms and activities to the public has increased this year, and the platform construction and user experience have been improved. In the future, we also expect all platforms to better plan their products and activities, giving priority to public participation capabilities.

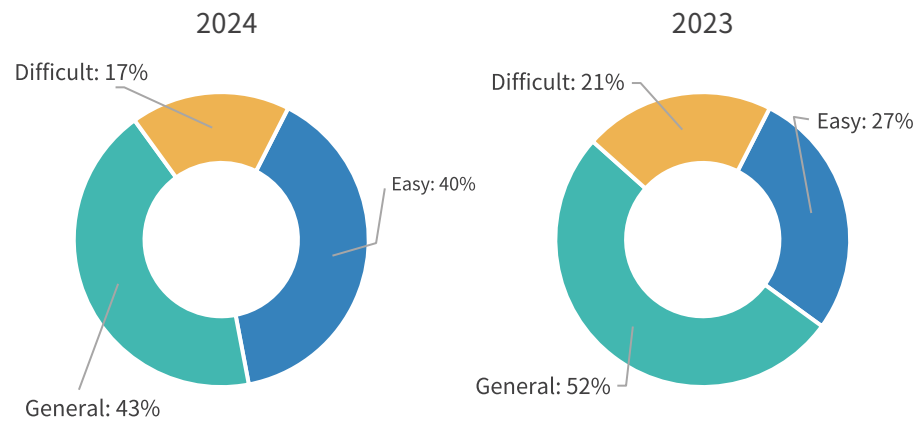


Figure 3.6 Statistical results of the difficulty of current carbon inclusion activities

In the survey of which carbon inclusion scenarios they have participated in, 94.5% of users have participated in the green travel, 64.5% have participated in the green consumption, 40% have participated in the old items recycling, and 45.5% of users have participated in the green life. Green travel includes the simplest and most direct participation methods such as walking, cycling and public transportation, so the vast majority of the public have participated. With the continuous improvement of the digitalization degree of various industries in China and the gradual popularization of the concept of green life and green consumption, the proportion of public participation in green consumption and green life is also gradually increasing. In terms of old items recycling, due to the strengthening of public environmental awareness in recent years, and the gradual improvement of recycling infrastructure in various communities and communities, the proportion has also increased.

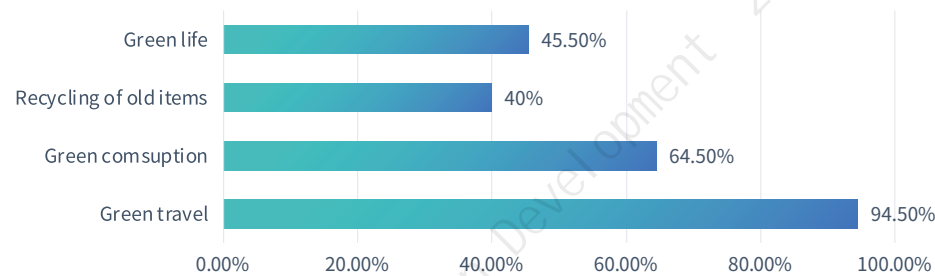


Figure 3.7 Statistical results of which carbon inclusion scenarios they have participated in [4]

[4] This question is a multiple-choice question. The percentage of multiple-choice options = the number of times the option has been selected ÷ the number of valid answer sheets

Green travel is the carbon inclusion scenario with the highest public participation. According to the statistical data of specific participation methods, 84% of users have participated in public transportation such as subway and bus, and 56.5% of the public choose to walk. The reason is that public transport and walking are the easiest and green ways to travel. 33 percent of the public choose cycling, and another 22 percent of the public choose new energy vehicles to travel. The proportion of these two figures is considerable, indicating that cycling is increasingly popular with the public. At the same time, due to the sharp increase in sales of new energy vehicles in China, it also increased the proportion of new energy vehicles.

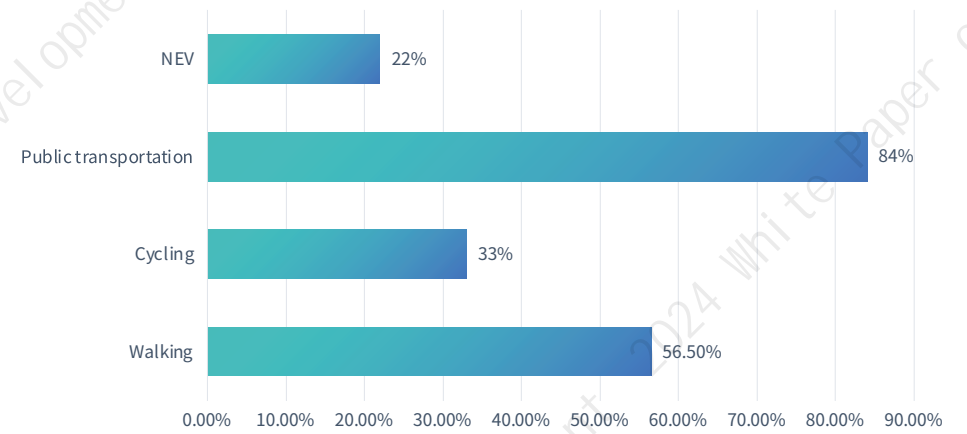


Figure 3.8 Statistical results of the specific participation modes of green travel [5]

On whether they have heard of the application of blockchain, WEB 3, AI and other new digital technologies in the field of carbon inclusion, 36% of users choose Yes, while 64% of users have not heard of it, which shows that the integration of carbon inclusion and these new technologies needs more investment and publicity.

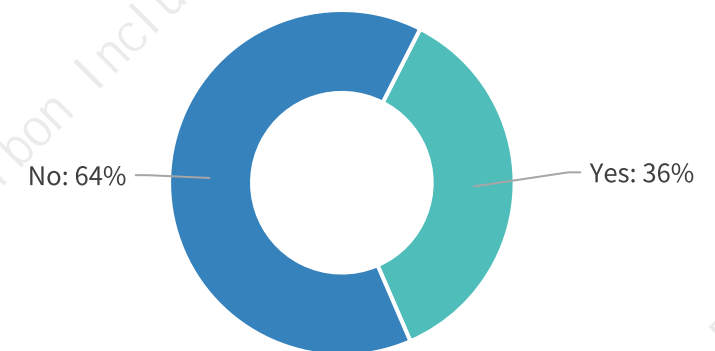


Figure 3.9 Statistical results of have you heard of the the application of blockchain, WEB 3, AI and other new digital technologies in the field of carbon inclusion

[5] This question is a multiple-choice question. The percentage of multiple-choice options = the number of times the option has been selected ÷ the number of valid answer sheets



On what rewards they want to get, 78.5 percent of users choose to get public transportation coupons, 78.5 percent choose cash deductions, and 48 percent choose platform coupons. The proportion of users who choose product exchange, certificates of honor accounts for 23% and 18%, respectively. Therefore, according to the statistical results, public transportation coupons and cash deduction are still the choice of the vast majority of users, but it also shows that users hope that various carbon inclusion platforms can have more categories and richer reward measures.

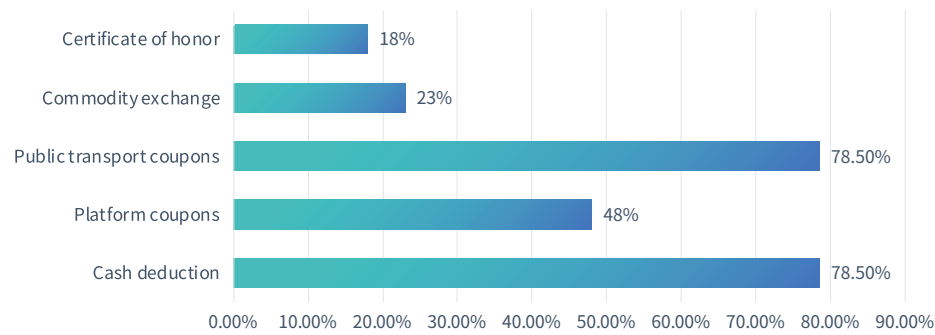
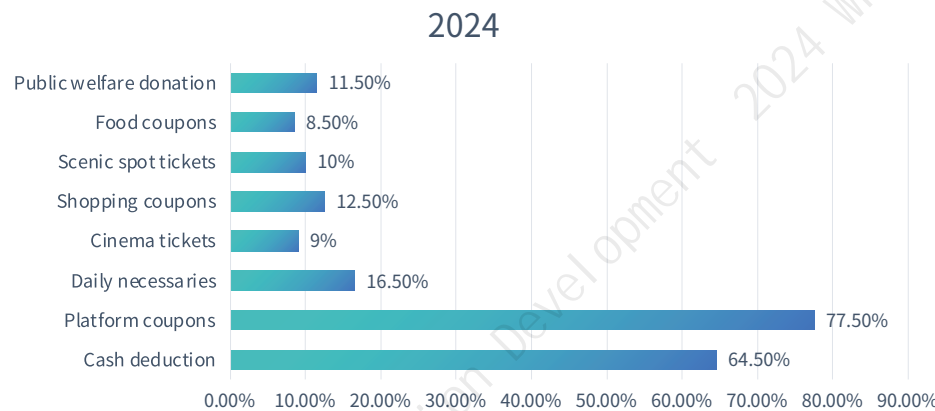


Figure 3.10 Statistical results of which rewards you want to receive through carbon inclusion 「6」

In terms of which items have been exchanged through carbon points, 64.5% and 77.5% of users choose cash deduction and platform coupons, and 16.5% of users choose to exchange daily necessities. The selection of shopping coupons, public welfare donations, scenic spot tickets, cinema tickets accounted for 12.5%, 11.5%, 10%, 9% and 8.5% respectively. The platforms cash deduction and coupons are still the first choice of the vast majority of users, and other redeemed items have also increased in different proportions compared with last year. It is worth mentioning that the proportion of public welfare donations has increased by 7 percentage points this year, indicating that the public recognition of participation in public welfare undertakings has increased. We also suggest that various platforms can cooperate with public welfare organizations to provide more public participation activities for public welfare in providing carbon inclusion service to the public.



「6」 This question is a multiple-choice question. The percentage of multiple-choice options=the number of times the option has been selected ÷ the number of valid answer sheets

### 2023

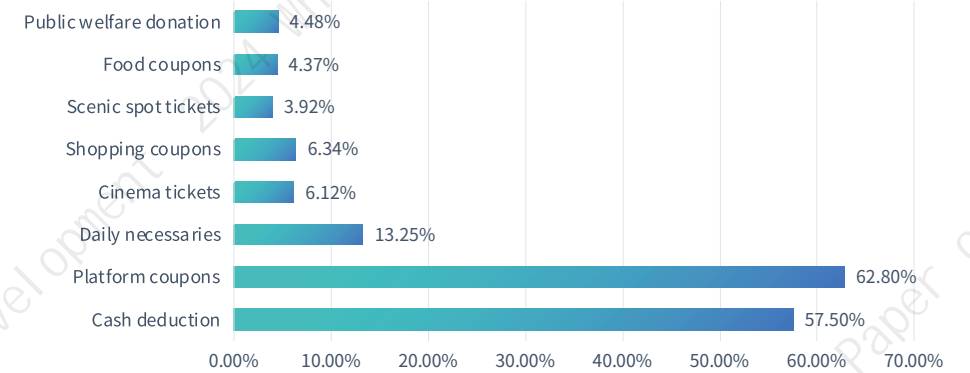


Figure 3.11 Statistical results of which items have been exchanged through carbon points 「7」

In the question of how much value the 1kg carbon reduction should correspond to, 67% of users think it should exceed 0.1 yuan, and 0.06–0.1 yuan is 20%, while only 7% and 6% of users choose 0.03–0.06 yuan and 0.01–0.03 yuan. This shows that users generally believe that carbon inclusion emission reduction should be more valuable. In terms of the current carbon price in the national carbon market, the price of carbon emission reduction per 1kg is about 0.09 yuan, while in the field of carbon inclusion, the transaction price of carbon emission reduction is about 0.04 yuan/kg. It is hoped that the price of carbon inclusion emission reduction will increase in the future, in line with the price of the national carbon market.

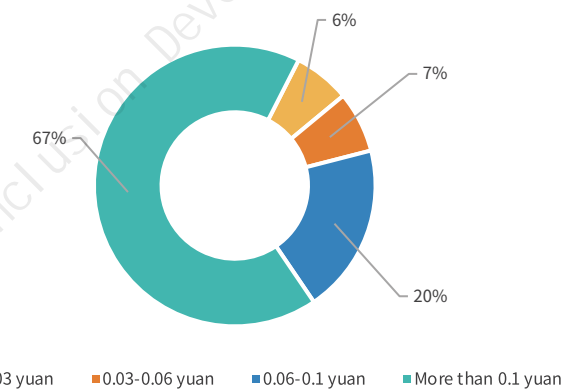


Figure 3.12 Statistical results of the value that 1kg of carbon inclusion reduction should correspond to



「7」 This question is a multiple-choice question. The percentage of multiple-choice options=the number of times the option has been selected ÷ the number of valid answer sheets

In think carbon inclusion to improve personal and social low carbon consciousness and action mainly reflected in the question, 86.5% of users think that participate in such activities can enhance the awareness of low carbon, 82.5% of users think carbon inclusion can guide low carbon action of individuals, 80% of users think it can promote the green and low carbon habit of individuals, 56.5% of users think it can promote the innovation of low carbon technology, 49.5% of users think it can promote the development of low carbon scenario, and 52.5% of users think that can promote the realization the goal of carbon neutrality. Statistically, the proportion of all options increased compared to last year, especially the development of low-carbon scenarios and the promotion of carbon neutrality, by 37% and 34%, respectively. The reason may be that the user groups participating in this survey are more accurate, and it also benefits from the publicity and popularization of China dual-carbon targets and the active promotion of major carbon inclusion platforms. Carbon inclusion plays an irreplaceable role in improving the publics awareness of green life and participating in low-carbon actions.

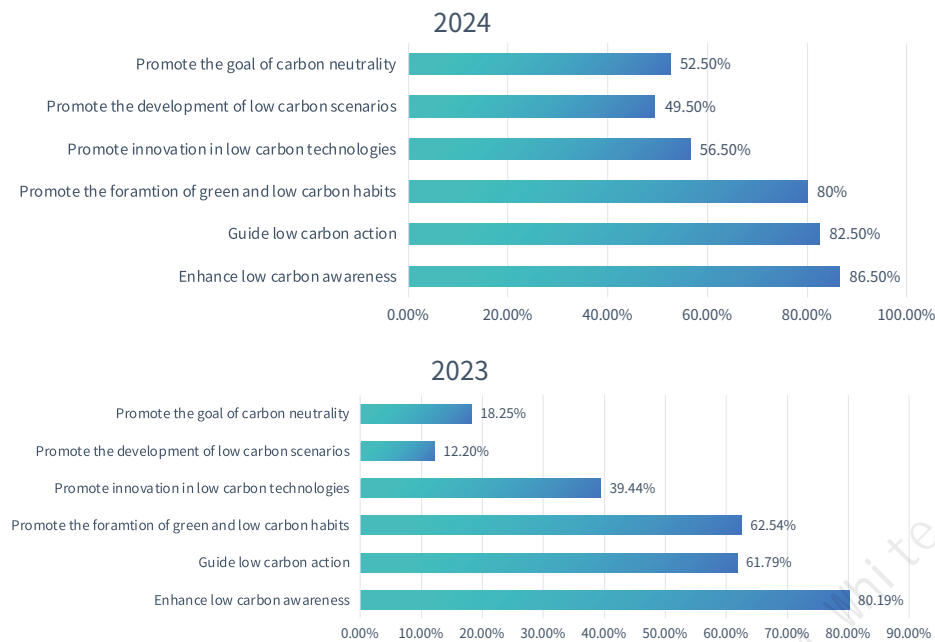


Figure 3.13 Statistical results of the role of carbon inclusion in improving low-carbon awareness and actions of individuals and society [8]

As for the question that government and enterprises should how to strengthen the carbon inclusion in the promotion and application of problems, 80% of users think they should provide more incentives, this proportion rose 24% last year, 67% of users choose to provide more carbon points exchange category, rose 35% from last year, shows that users hope get more in the practice of carbon inclusion and more valuable incentive policy can let users choose to their rights and exchange items .77 percent of users said online publicity should be intensified, and 62 percent said more offline activities should be carried out. Another 66.5% of users suggest to add more carbon inclusion scenario, 47% of users suggest to improve the platform experience, the two compared last year, it also shows that

[8] This question is a multiple-choice question. The percentage of multiple-choice options=the number of times the option has been selected ÷ the number of valid answer sheets

the government and enterprises should gradually develop more carbon inclusion scenario, at the same time constantly improve the carbon inclusion platform and user experience, let the public can easily use related products, so as to further guide and encourage more public to participate in the development of carbon inclusion.

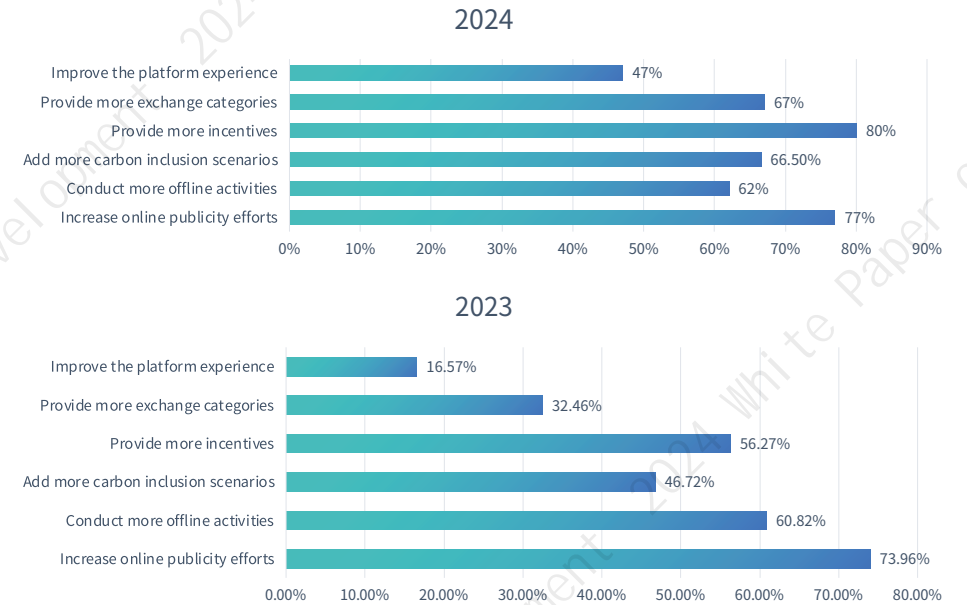


Figure 3.14 Statistical results of how governments and enterprises should strengthen the promotion and application of carbon inclusion [9]

On the question of whether they would recommend others to participate in the carbon inclusion activities, 92% of users chose to recommend others to participate, while only 8% chose not, up 5% from last year. It shows that the development of carbon inclusion in China has been recognized by the vast majority of the public, forming a positive cycle. In the future, more public will be willing to participate in and spread the concept and activities of carbon inclusion.

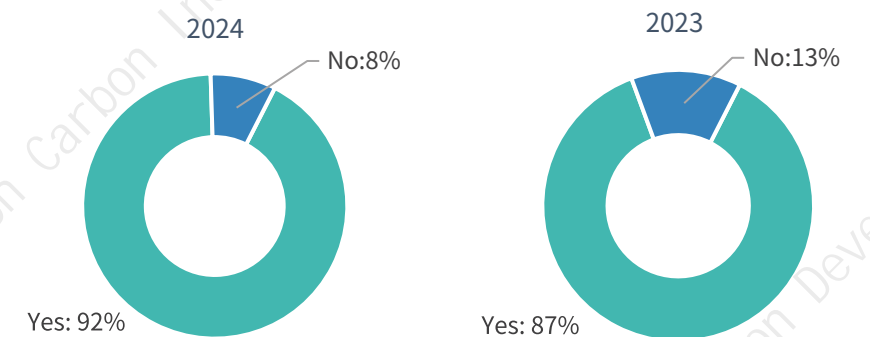


Figure 3.15 Whether others will be recommended to participate in carbon inclusion activities

[9] This question is a multiple-choice question. The percentage of multiple-choice options=the number of times the option has been selected ÷ the number of valid answer sheets

### 3.2 Analysis of public participation in the carbon inclusion scenario

In the last section, by analyzing the survey results of the public, their understanding and participation in carbon inclusion scenarios have been analyzed from different dimensions. This section and the next section of the equity analysis of public carbon inclusion, we respectively selected the editor unit Chengdu "Tianfu Carbon Credits" platform, Wuhan "Zero Carbon Together" platform and Miotech "Mio" carbon inclusion mini program to process the data analysis, in order to further understand the actual participation of carbon inclusion.

Chengdu "Tianfu Carbon Credits" divides the low-carbon scenarios into six categories: green travel, low-carbon community, low-carbon culture and education, low-carbon service, low-carbon leisure and low-carbon consumption. According to the different ways of participation, the low-carbon scenarios can be further divided into the offline low-carbon behavior scenario and the online low-carbon publicity scenario. Among them, the scenarios such as walking, bus travel, subway travel, bicycle travel and so on require the practice of offline low-carbon behavior, and can effectively produce carbon emission reduction, which is a low-carbon behavior scenario. In online low-carbon publicity scenarios such as off-peak travel, clean your plate campaign and garbage classification games, users only need to obtain carbon points by playing playing games and browsing information and learning knowledge. As of October 20,2024, the total number of people participating in "Tianfu Carbon Credits" has reached more than 8 million. Compared with 2023, the number of participants increased by nearly 20%. This data shows that the guidance effect of government policy is obvious, the enterprise awareness of environmental protection is enhanced, the public awareness of low carbon is enhanced, and the popularization of "Tianfu Carbon Credits" mechanism is increased. At the same time, it reflects that the integral rules are complete, and the management process and data collection system are consistent.

Specific data show that from January 2024 to October 20,2024, the participation of "Tianfu Carbon Credits" green travel scenario was the highest, accounting for 45%, and a total of nearly 2 million people participated, with a year-on-year increase of 16%. Followed by low-carbon communities with 1.4 million participants, accounting for 32 percent, up 23 percent year on year. Due to the vigorous publicity and promotion of the platform, nearly 700,000 people participated in the low-carbon culture and education scenario during the statistical period, with a year-on-year growth of 236%, with the largest growth rate among the six categories of low-carbon scenarios.

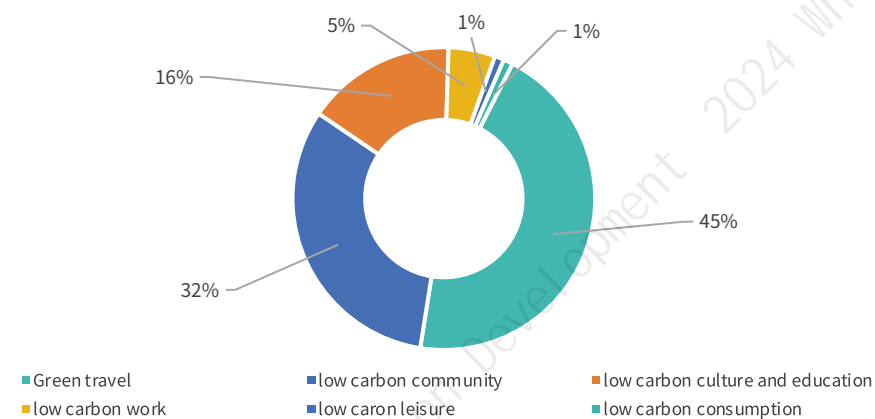


Figure 3.16 The portion of participation in carbon inclusion scenarios of "Tianfu Carbon Credits" platform

Source: provided by "Tianfu Carbon Credits" platform

According to the data display, "Tianfu Carbon Credits" successively with Hello-bike, Meituan shared cycling, the highest participation in green travel, reached nearly 1.3 million people, accounting for 65% of the total green travel participation, followed by walking, a total of more than 50 people to participate in, accounting for 26% of the total green travel participation. "Tianfu Carbon Credits" and Rong E Xing jointly create the scenario of fuel vehicles. After users go to Rong E Xing to declare the suspension of fuel vehicles, they can get carbon points. More than 50,000 people have participated the new energy vehicle ride hailing and carpooling scenario that created by "Tianfu Carbon Credits" and T3 Mobility. Users can get the corresponding carbon points according to the mileage. In addition to the low-carbon behavior scenario, "Tianfu Carbon Credits" also offers an online education of "off-peak travel". Users can get the carbon points when completing the off-peak travel every day. It advocates the public to choose off-peak travel and avoid congestion, and a total of more than 150,000 people have participated.

In terms of low-carbon communities, since 2024, over 100,000 people have received carbon point rewards by completing offline garbage classification and recycling; Online education scenarios such as household waste classification, hazardous waste notification cards, expired drug recycling, and clean your plate campaign have attracted over 1.3 million participants, an increase of 25% compared to 2023. In terms of low-carbon culture and education, in 2024, nearly 700,000 people participated in urban culture exhibition, about 3.5 times that of 2023. In terms of low-carbon service, the participants in life payment, green medical care, real estate evaluation and inquiry scenarios created with Alipay accounted for the largest proportion. In 2024, more than 200,000 people participated, an increase of about 14% compared with 2023. In addition, the newly added zero carbon conference room in 2024 has attracted over 3000 participants to check-in. In terms of low-carbon consumption, the scenario has attracted over 40000 participants, which is about four times the number of participants in 2023.

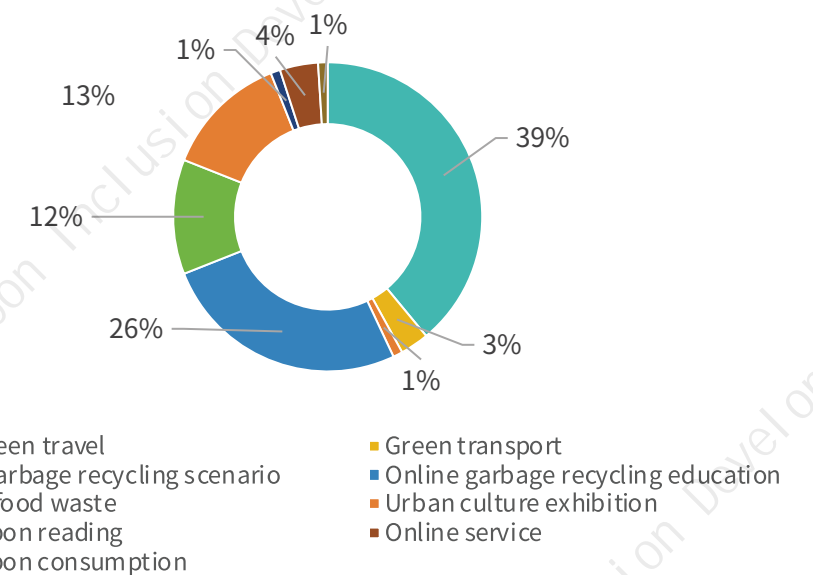


Figure 3.17 Comparison of participation in carbon inclusion scenarios by segmentation on "Tianfu Carbon Credits" platform

Source: provided by "Tianfu Carbon Credits" platform

At present, "Zero Carbon Together" platform has established 11 low-carbon life scenarios, including cycling, bus, subway, carpool, new energy vehicle travel, new energy vehicle charging, residents saving electricity, renewable recycling, self-provided shopping bags, green government affairs, green medical care. The connected enterprises include Kuaidian, Alipay ride code, Didi, T3 Mobility, etc. From the frequency of user participation, the proportion of subway is the highest, accounting for 26% of all scenarios; the second is NEV travel and NEV charging accounting for 19% and 15% respectively (the latter has late data docking, so the data comparability is limited), and the use frequency of bus, cycling and residential electricity is about 10%, and the proportion of "bring your own bags" and garbage classification accounts for less than 5%.

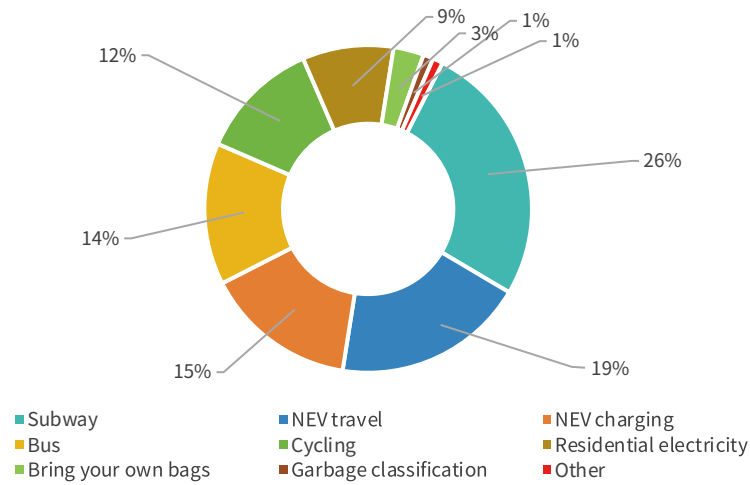


Figure 3.18 Participation proportion of "Zero Carbon Together" platform

Source: provided by "Zero Carbon Together" platform

The first two scenarios with the highest participation in the "Mio" carbon inclusion mini program were walking and subway, accounting for 55.93% and 34.28%, respectively. This also further shows that the simple and convenient way of green travel, such as walking and subway, fit the public's life.

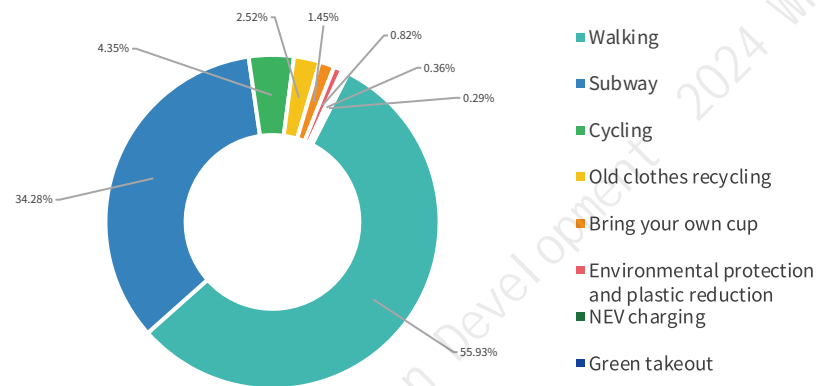


Figure 3.19 Participation ranking of different scenarios in "Mio" mini program

Source: According to the data provided by Mio Technology, based on the "Mio" carbon inclusion mini program  
 Note: Some scenarios of Mio connected with the third-party platform. After completing the authorization of both sides users can get carbon points in Mio after completing the low-carbon task on the third-party platform

### 3.3 Public carbon inclusion item exchange analysis

In the analysis of the public carbon inclusion item exchange, we noticed that the same C-end carbon inclusion platform, due to the influence of different factors such as operating subjects, urban geographical location, product characteristics, items categories, the exchange of items on different platforms are different.

Now, "Tianfu Carbon Credits" E-mall includes green travel, life services, cultural products, lucky bag, other products, props products, and has absorbed more than two hundred kinds of products or services, including cultural products and life services are more than 50 kinds, more than 20 kinds of travel service, the lucky bag more than 70 kinds, total products has exceeded 400, and the times of points redeemed will reach 3 million, of which physical orders account for about 75%. Among them, travel coupons are the most popular among users of "Tianfu Carbon Credits", followed by cash deduction, platform coupons, and physical items. Therefore, green travel coupons account for the largest proportion of exchange item issued by "Tianfu Carbon Credits". More than 600,000 green travel coupons have been issued through activities. Green travel including bus and subway coupons, bicycle riding cards, new energy vehicle charging coupons, parking coupons, and new energy ride hailing coupons.

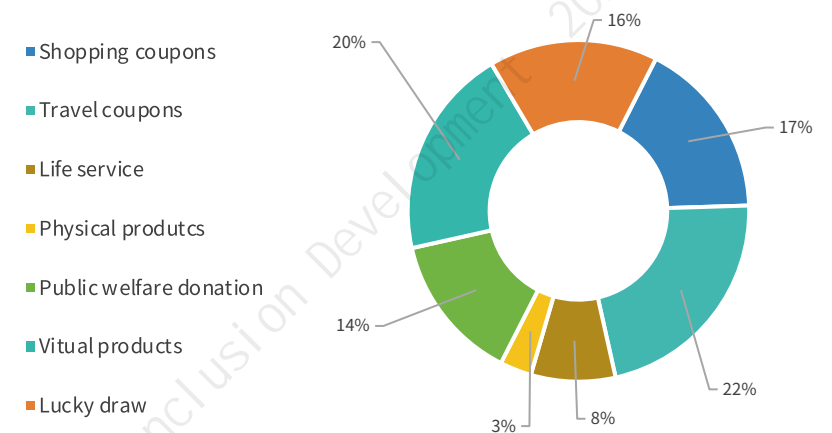


Figure 3.20 The proportion of items exchanged by users of "Tianfu Carbon Credits" platform

Source: provided by the "Tianfu Carbon Credits" platform

At present, the incentives for the Wuhan "Zero Carbon Together" platform low-carbon mall are mainly based on commercial incentives such as coupons and products, supplemented by public welfare souvenirs provided by government departments. The exchange rate of such items accounts for 84% of the total. In addition to exchanging rights in the low-carbon mall, "Zero Carbon Together" platform also launched the "low-carbon activities" section, namely public welfare donations for carbon neutrality, which account for 16% of the personal emission reduction.

Among the exchange items, the exchange rate of IP cultural and creative products is the highest, about 46%, followed by subway travel cards (worth 50 yuan) and convenience store coupons (50% discount), accounting for 25% and 22% respectively. Others, such as cycling coupons, account for 7%, which shows that citizens are more inclined to exchange items with platform characteristics and benefits.

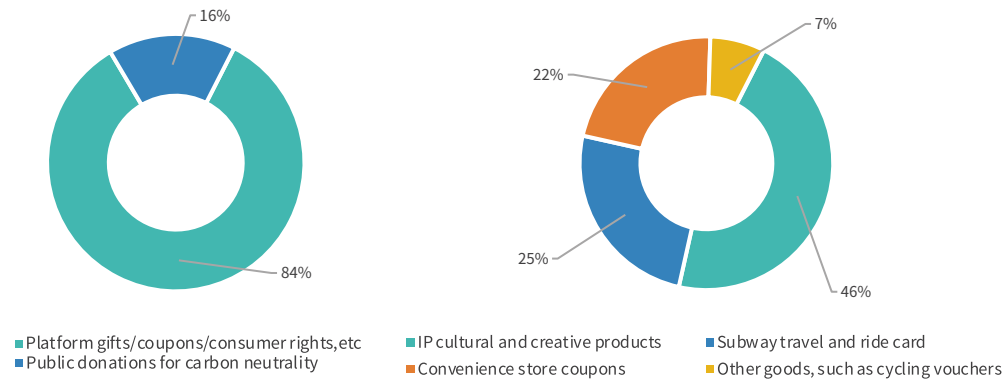


Figure 3.21 The proportion of items exchanged by users of "Zero Carbon Together" platform

Source: provided by the "Zero Carbon Together" platform

In the "Mio" carbon inclusion mini program, the majority of exchanges are consumer coupons, followed by green travel such as subway cards, cycling cards, charging coupons.

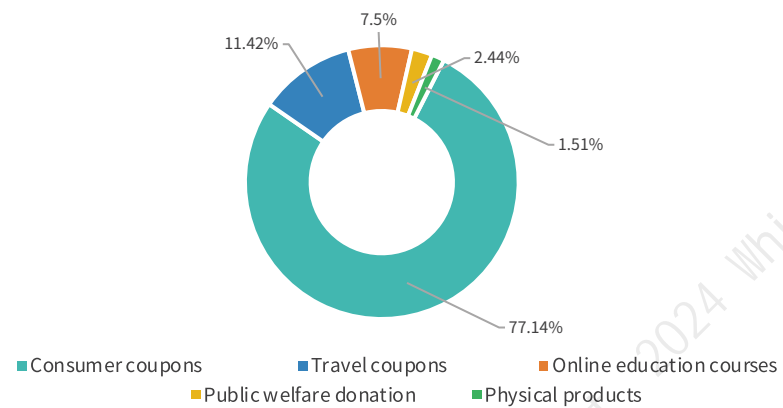
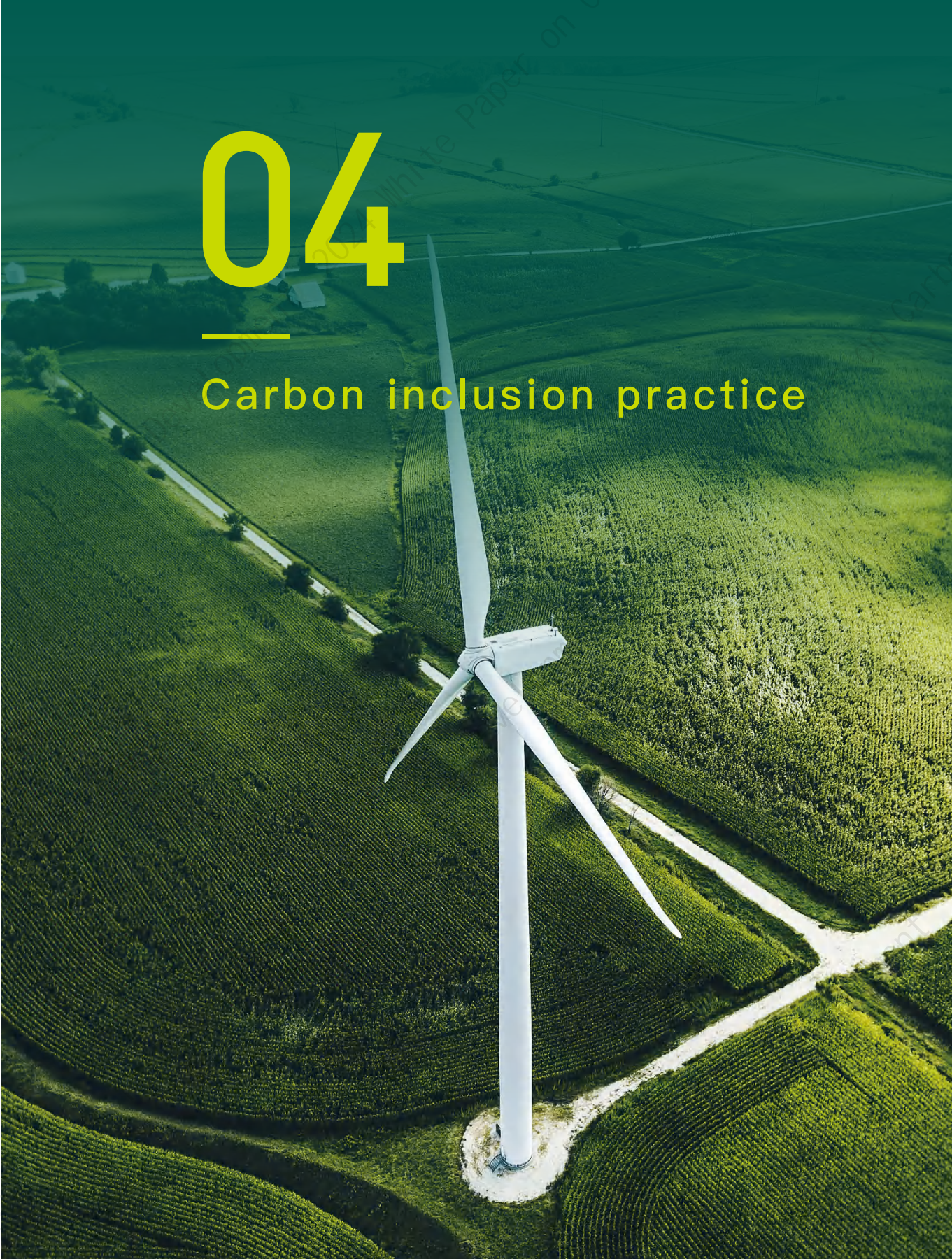


Figure 3.22 The portion of items exchanged of users on "Mio" mini program

Source: According to the information provided by Mio Technology, based on the "Mio" carbon inclusion mini program  
Note: The physical product SKU is about 15%, and the rest are all virtual goods



# 04

## Carbon inclusion practice

## 4.1 Platform-type Carbon inclusion practice

Carbon inclusion platform is an important carrier for the practice of carbon inclusion. In particular, the urban carbon inclusion platform led by the government, which has the advantages of policies, resources, publicity and other aspects. Each platform continuously inject new impetus into the development of China carbon inclusion mechanism through continuous innovation practice.

### (a) Combining youth volunteer service with green and low-carbon innovation

Chengdu "Tianfu Carbon Credits" platform focuses on strengthening low-carbon culture and education, based on public welfare practice and ecological and environmental protection publicity and education needs, strengthen the cooperation with "QingJujin-GuanCheng", and jointly launch environmental protection public welfare scenarios. A youth volunteer service theme activity was held at Qinglonghu Wetland Park. At the event site, the "QingJujinGuanCheng" and "Tianfu Carbon Credits" interchange ceremony was launched, and the "QingJujinGuanCheng X Tianfu Carbon Credits" youth volunteer service incentive plan was officially implemented. This is also the first innovative practice in the country that combines young volunteers with green and low-carbon, and was reported by China Youth Daily. The creation of youth volunteer service aims to widely call on young people in the city to practice socialist core values and actively participate in volunteer services to build a happy Chengdu.

### (b) Ningxia Carbon Inclusion activities into the community

On June 27, 2024, Ningxia Carbon Inclusion entered the Wenyi community of Jiefang West Street, Xingqing District, Yinchuan City, and carried out a carbon inclusion publicity activity. The activity is carried out through the combination of carbon popularization publicity exhibition rack, online code scanning questions and carbon popularization knowledge publicity. Ningxia Carbon Inclusion staff from "clothing, food, housing, transportation, and use" around low carbon behavior as a breakthrough point, comprehensively introduces the operation principle of carbon inclusion and carbon inclusion system construction, the scene demonstration of online carbon inclusion integral for the concrete steps, called on the public to actively practice green low carbon behavior, accumulate emissions, participate in more carbon neutral activities. The warm activity atmosphere attracted a number of community residents to participate in and learn the relevant knowledge of carbon inclusion, and greatly spread the concept of low-carbon, energy-saving, simple and moderate green life. Residents at the site won small gifts such as environmental protection bags provided by Ningxia Carbon Inclusion through interesting online Q&A.

### (c) Shenzhen Carbon Inclusion into Sun Yat-sen University

On September 27, 2024, Shenzhen Municipal Bureau of Ecology and Environment, Shenzhen Bao'an District Environmental Protection Industry Association, School of Advanced Energy of Sun Yat-sen University, School of Environmental Science and Engineering of Sun Yat-sen University and other units on behalf of industry experts and scholars in Sun Yat-sen university, Shenzhen campus west teaching hall carried out the "build green future — explore the infinite possibilities carbon inclusion" theme forum, to the campus teachers and students read carbon inclusion policy, specific content and implementation mode. The exhibition outside the lecture hall attracted many students to watch and learn low-carbon lifestyle and carbon inclusion practice. Through the theme forum, students deeply realized the significance of personal actions for promoting the green and low-carbon transformation of the society, and expressed that they would actively practice the low-carbon lifestyle to reduce the burden on the earth and add luster to the future.

### (d) Chengdu "Tianfu Carbon Credits" platform joint marathon activity

Chengdu "Tianfu Carbon Credits" platform for three consecutive years participate in Chengdu marathon, jointly launched "Every step, is further to green dream" slogan, advocating green low carbon behavior, and launched a online game, let more users feel marathon passion and the charm of green life, in the form of movement + environmental protection focus on ecology, environmental protection, jointly advocate low carbon emissions concept, actively practice green low carbon life concept, in 2024 online activities accumulated more than 100,000 people involved. In 2023, they jointly launch the "Green Run, Low Carbon Companion" ranking activity, and distribute free 2023 Chengdu Marathon participation quotas to users who actively participate in low-carbon behavior. At the same time, "Tianfu Carbon Credits" has been promoted and displayed for two consecutive years at the starting site of the Chengdu Marathon and the Chengdu Marathon Expo, advocating the concept of green and low-carbon life and distribute the quota of 2023 Chengdu Marathon to users who actively participate in low-carbon behavior. At the same time, "Tianfu Carbon Credits" has been publicized and displayed at the starting site of Chengdu Marathon and the Chengdu Marathon Expo for two consecutive years, advocating the concept of green and low-carbon life.



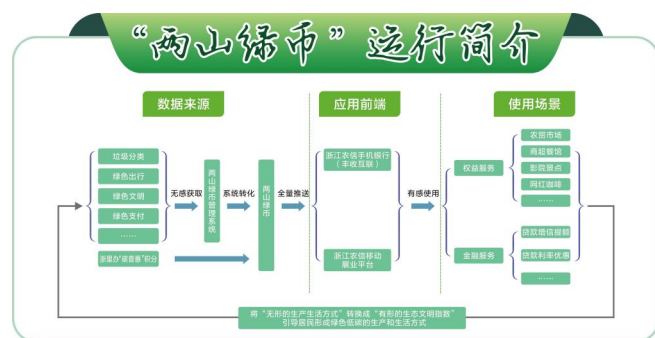
Figure 4.1 Exhibition picture of Chengdu "Tianfu Carbon Credits" Platform and Chengdu Marathon

## 4.2 Enterprise-type carbon inclusion practice

In 2023 White Paper, we put the carbon inclusion platform for internal employees and the typical carbon account application platform for enterprise users in the analysis section of the carbon inclusion platform mechanism, analyzed the two types of platform mechanisms, and displayed the carbon inclusion platform and carbon account of some enterprise employees. This year, due to the vigorous development of carbon inclusion in China, and enterprises as the main force and connector of the carbon inclusion mechanism, on the one hand, it can provide rich carbon emission reduction application scenarios and low carbon consumption scenarios for carbon inclusion, on the other hand, it can be used as a platform to require employees to actively participate in the practice of carbon inclusion. This year, we selected and introduced the practice of enterprises in different industries.

### (a) Banking industry: Anji Rural Commercial Bank "Two Mountains Green Coins": a "new engine" driving low-carbon life

As a demonstration site for green finance reform and service innovation in Huzhou City, Anji Rural Commercial Bank aims to develop green and low-carbon industries, advocate green consumption, and promote the formation of green and low-carbon production and lifestyle. In response to the urgent need for overall green and low-carbon development in society, Anji Rural Commercial Bank extends the concept of green inclusion to ordinary people and innovatively launches the "Two Mountains Green Coin" system. By collecting carbon emission reduction data related to climate and environment in residents' daily lives, converting it into green points according to corresponding rules, and providing services such as financial value-added, livelihood benefits, and items exchange. With the support of the Anji County Party Committee and Government, the system is being promoted across the entire area, transforming the "intangible production and lifestyle" into a "tangible ecological civilization index", and guiding residents to practice green and low-carbon living with "visible and tangible" incentive measures.



**Adhere to the green leadership, explore the "Two Moutains Green Coins" transformation mechanism**

Anji Rural Commercial Bank helps to reduce carbon dioxide emissions, reduce coal consumption, help ecological governance, and increase the civilization index as the standard, and defines the three modules of green behavior, namely, green life, green civilization and green payment. At the same time, the bank actively integrated into the crucial work of the county, carried out strategic cooperation with government departments, obtained green behavior data such as garbage classification, public cycling, public tree planting and volunteer service, and scientifically quantified green behavior data as "Two Moutains Green Coins" based on relevant methodology.

**Strengthen digital empowerment, develop "Two Moutains Green Coins" digital intelligence application**

Relying on the digital reform, the "Two Mountain Green Coins" management system is developed, including many functions such as green data source integration, "Two Mountain Green Coins" transformation, environmental benefit calculation and so on, which is used to dynamically manage residents to obtain and use the "Two Mountain Green Coins". At the same time, for residents, the "Two Mountains Green Coin" mobile banking mini program is developed and launched to facilitate residents to understand and use "Two Mountain Green Coins" online in real time, and establish personal carbon accounts to quantify personal carbon emission reduction, so as to achieve the daily use of "Two Mountain Green Coins" by residents. At present, "Two Mountains Green Coins" has been successfully put on the Carbon Inclusion Platform of Zhejiang Province, and residents can exchange "carbon inclusion" points into "Two Mountains Green Coins" for use. At present, the number of customers of "Two Mountain Green Coins" has exceeded 250,000.

**Highlight the benefit of the people and enrich the application scenarios of "Two Mountains Green Coins"**

First, financial services. By using the "Two Mountains Green Coins", residents can enjoy financial services such as loan credit increase and preferential interest rates. The second is rights and interests services. In the merchants where Anji Rural Commercial Bank collection code is placed (such as cinemas, supermarkets, coffee shops, restaurants, tourist attractions, etc.), residents can realize the consumption deduction of "Two Mountains Green Coins". This application scenario has covered nearly 30,000 merchants in the county. Third, physical products exchange. The bank has built "AnXinYinYao Club" to carry out the exchange of physical products, and guide the elderly in the county to give full play to their residual heat and actively participate in all kinds of green civilization volunteer activities. Fourth, innovative services, the bank is closely related to the work of local centers, and constantly innovate services. Departments such as the Development and Reform Bureau and the Market Supervision Bureau have issued the "Implementation Plan for Promoting the Application of Bamboo as a Substitute for Plastic in Anji County Agricultural Market", and have formulated incentive mechanisms for "Two Mountains Green Coins" from the production, circulation, consumption, and management ends.

From the perspective of the industry, in recent years, many banks have incorporated personal carbon accounts into their green finance product innovation system and are laying out personal carbon accounts. Up to now, more than ten banks including China Construction Bank, Industrial and Commercial Bank of China, Postal Savings Bank of China, and Ping An Bank have successively launched personal carbon account platforms, recording users' carbon reduction emissions from various green and low-carbon behaviors in their personal carbon accounts. In order to encourage the public to practice the concept of green and low-carbon life, various banks have provided rich rights and benefits, such as shared bicycle riding cards, consumption vouchers and other life rights.

Bank	Service	Platform	Carbon points source
China Construction Bank	Carbon Book	CCB Life App, Mobile Banking App, Mini Program	It covers low-carbon life, transfer and remittance, online payment, network service, investment and financial management, and has a total of 15 green and low-carbon behaviors
Postal Savings Bank of China	C-Youji	C-Youji Platform	Focusing on the four low-carbon scenarios of green finance, green life, green countryside and green public welfare, a total of 20 green and low-carbon behaviors
Industrial and Commercial Bank of China	Carbon Space	Mobile Banking App	Transfer and remittance, living payment, opening of ICBC e-wallet, opening and upgrading of digital RMB wallet, online number collection, etc
China CITIC Bank	CITIC Carbon Account	Credit Card Center App, Debit Card App	E-credit card, E-bill, online payment, no medium debit card opening, online transfer, loan processing, loan repayment
Shanghai Pudong Development Bank	Personal Carbon Account	Pudaxiben App, Green & low-carbon Zone	Bus and subway travel, shared bike cycling, public payment, new energy vehicle charging and other six green consumption
Ping An Bank	Low Carbon Home	Pocket Banking App	There are 21 online business scenarios for low-carbon travel, digital finance and 21 green behavior scenarios
China Merchants Bank	TanXun Xingkong	Mobile Banking App	Low-carbon tasks are mainly divided into three categories, including low-carbon travel, online transactions, and online inquiry
Guilin Bank	G + Low-carbon expert	Mobile Banking App	Covering green life, green travel, green payment, green consumption and other four scenarios
Bank of Gansu	Carbon Points	Mobile Banking Service APP	Low-carbon financial scenarios such as online transfer, online payment and e-government, and green travel projects such as walking and cycling
Bank of Rizhao	Personal carbon Account	Mobile banking App "Rixinyue E" life financial services	Including green life, green payment, green credit, green government affairs and other four major scenes
Bank of Kunlun	Personal Carbon Account	WeChat Bank	Green payment, green travel, green living and other three areas of low-carbon behavior

Table 6 Bank information of personal carbon account already put online

Source: Southern Finance and Economics

**(b) Transportation industry: ZEEKR Z-Green carbon inclusion trading innovation practices**

Since June 2022, ZEEKR has launched the "Z-Green Community" in its App. ZEEKR Z-Green community users accumulate carbon emissions through low-carbon behaviors such as driving electric vehicles or walking, and continue to advocate and promote low-carbon concepts in the community, in order to obtain point incentives for EV charging scenarios, vehicle services, low-carbon products exchange, low-carbon community activity participation, etc., to meet the multi-level and diversified low-carbon living needs of users and achieve a carbon inclusion closed loop within the ZEEKR ecosystem. As of October 20, 2024, the number of users participating in the "Carbon Reduction Action" has reached 699,521, with a cumulative emission reduction of 252,940tCO<sub>2</sub>e, equivalent to the annual carbon sink of 56.39 million trees. In terms of low-carbon community activities, Z-Green Community has launched many meaningful environmental protection activities such as "desert tree planting" and "welcoming mythical birds together" in 2024, working together with users to protect our precious natural heritage.

Z-Green is also actively exploring carbon inclusion closed loops outside of the ZEEKR ecosystem, actively joining the Huzhou Carbon Inclusion Cooperation Network, promoting Huzhou's green travel carbon inclusion trading activities, helping to achieve carbon neutrality in marathon events, and contributing to the Huzhou NEV travel carbon inclusion trading scene. The 10 ZEEKR car owners who participated in this carbon trading activity generated a total of 19.08 tons of carbon emissions through driving electric vehicles, and obtained the "Huzhou NEV Travel Carbon Emission Reduction Certificate" jointly issued by the State Grid New Energy Cloud Carbon Neutrality Innovation Center and the China Quality Certification Center. The corresponding carbon emissions will be used to offset the carbon emissions throughout the first marathon event in Huzhou on December 3, 2023, in order to fully achieve a "zero carbon" marathon.

**(c) Industrial Manufacturing: Siemens —We Zero low-carbon applications for staff**

MioTech provides one-stop enterprise employee carbon emission reduction solutions for Siemens employees low carbon application "We Zero", from the quantification of low carbon office green effect to the transformation of personal incentive, and designs and develops employee carbon emission reduction applications for Siemens. Siemens employees can easily record their green office behaviors, such as commuting, travel, mixed office, etc., and accumulate carbon energy. The clear carbon reduction details and level list of carbon reduction enable employees to understand their carbon reduction progress in real time, and gradually grow from "low-carbon freshman" to "home guard". At the same time, the data visualization and ranking design make the carbon reduction progress of departments and companies clear at a glance, making the green results clearly visible and traceable.

Centering on the sustainable strategic framework of Siemens DEGREE, MioTech has carefully designed the We Zero operation mechanism to better respond to Siemens sustainable development practices. Siemens through its own low carbon equipment to promote customer green transformation, We Zero through the knowledge learning and Q&A, let employees to further understand the enterprise own green technology, also let sales understand each green products for customers to avoid much carbon emissions —truly promote green technology popularization, support the development of low carbon business. In terms of operation mechanism, by punching in daily low-carbon tasks and participating in cross-departmental green initiative activities, employees can understand Siemens sustainable practices, actively participate in technology and product innovation, and jointly start the journey of sustainable development, so as to become ambassadors of green technology and practitioners of low-carbon goals.

The "Golden Idea" program, launched in 2022, encourages every Siemens employee to



Figure 4.2 Screenshot of "We Zero"App

make suggestions for decarbonization and improving resource efficiency. By the end of 2024, Siemens had collected more than 1,300 innovations, covering green behavior, green products and digital services, energy efficiency improvement, resource recycling and other aspects. We Zero also integrates Siemens sustainable development flagship project "Golden Idea" plan into its product design. Through the dual effect form of integral incentive and ranking recognition, it aims to encourage more employees to explore innovative solutions of net zero in their work and strive to be the "zero carbon pioneer" together. During Earth Month this year, over 2400 Siemens employees actively participated in the low-carbon check-in challenge activity at We Zero, practicing green actions and reducing emissions by over 6,586 kilograms through completing low carbon commuting tasks and walking tasks. From implementing low-carbon behavior to enhancing awareness of green products and business, We Zero integrates sustainable practices into all aspects of daily office work.

**(d) Tourism industry: Ctrip Business Travel enterprise carbon account**

On December 5,2023, Ctrip launched its carbon account, realizing the full statistics of carbon emission data of business travel, providing detailed data display of carbon emission for enterprises, and encouraging more enterprises to reduce carbon in business travel. In order to encourage ordinary employees to choose low-carbon travel, Ctrip will display the carbon emission data of different products, and will lead the enterprise employees to choose low-carbon travel through various forms of low-carbon popular science. Through the dual influence of corporate travel decision-makers and corporate employees, Ctrip's Business Travel carbon account has set up a low-carbon travel system to help enterprises reduce carbon emissions.

According to data released by Ctrip, Guangdong has become a leading province in low-carbon travel companies, with Guangdong holding eight of the top 20 cities in low-carbon travel companies, while the top five cities are Shenzhen, Shanghai, Suzhou, Beijing and Xinxiang.



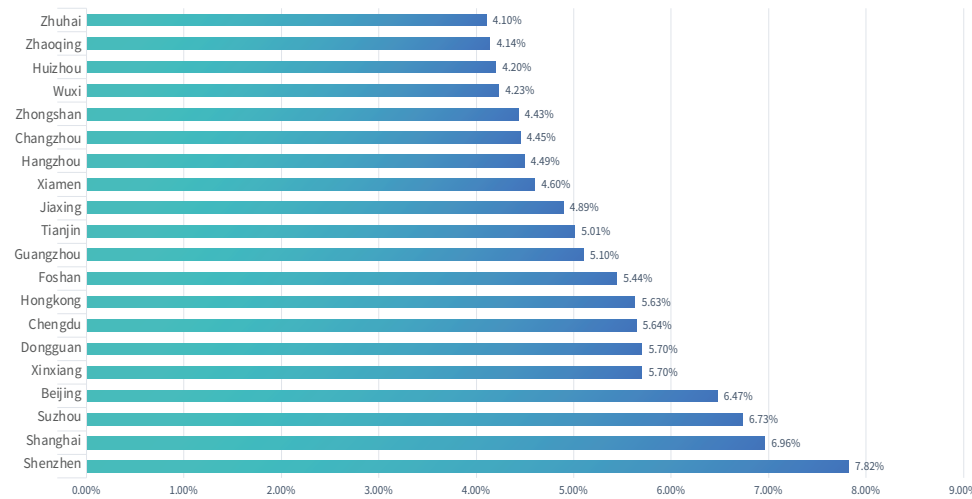


Table 7 TOP20 ranking of enterprises practicing low-carbon travel cities

Source: Ctrip

### (e) Steel industry: "Angang Capital" Employee Carbon Inclusion Platform

In June 2024, the "Launch Meeting of the Employee Carbon Inclusion Platform of Angang Group Capital Holding Co., Ltd." jointly organized by Angang Group Capital Holding Co., Ltd. (hereinafter referred to as "Angang Capital") and China CITIC Bank was held in Beijing. After more than two years of joint efforts and careful preparation by both sides, the first employee carbon account service platform in the steel industry, — Angang Capital, "Employee Carbon Inclusion Platform" has started trial operation. Angang Capital's "Employee Carbon Inclusion Platform" was jointly launched by Angang Capital and China Citic Bank. The two sides have jointly developed the enterprise version of the employee carbon inclusion platform, covering 23 green scenarios, and implementing the low-carbon actions into the daily life and work of employees. Angang Capital "Employee Carbon Inclusion Platform" relying on the information comprehensive service ability, and play to "Citic Carbon Account" financial technology and digital platform advantage, with science and technology, intelligent, visualization, specialization, to encourage Angang Capital staff voluntary practice of low carbon emissions, provide incentives for the employee who makes contribute to the low carbon society, utilize the role of market allocation to achieve the goal of active public participation in energy conservation and emission reduction.

Through two years of development, "Angang Capital" has developed 23 low-carbon emission reduction scenarios in 8 categories, including paperless office, paperless finance, low-carbon travel, low-carbon commuting, book donation, clothing recycling, clear your plate, and tree planting activities, for staff production and life scenarios. Authorized by users, it automatically collects the standard low-carbon behavior data of employees in different life scenarios, and calculates and accumulates personal carbon emission reduction through scientific measurement methods, effectively promoting the extensive integration of green and low-carbon into peoples life.

### (f) Recycling industry: Carbon inclusion helps the "Internet +" garbage classification

In order to help "Internet +" garbage classification, speed up the construction of garbage recycling scenario, increase the promotion of household garbage classification, and build and share low-carbon communities, four enterprises, LvGangHuanZi, GuoXinChuangZhi, TanShiGuang, YinGuTanHui have reached cooperation with the "Tianfu Carbon Credits" platform. This is also that "Tianfu Carbon Credits" takes the lead in combining "Internet +" with garbage classification among similar carbon inclusion platforms, realizing the synchronization of online and offline data, and creating more convenient garbage recycling scenario. At present, the cooperation platform has more than 600 offline recycling sites, covering all 23 districts and counties in Chengdu.

TanShiGuang and "Tianfu Carbon Credits" platform jointly launched TanShiGuang Convenience Service Cabin, providing a convenient way for residents to participate in carbon inclusion. One cabin reduces about 300-500 tons of carbon for the community every year. At present, more than 70 carbon neutral cabins have been built, covering five major urban areas. More than 5,600 tons of recyclable garbage can be classified, and more than 1.65 million people have participated, achieving energy conservation and emission reduction of about 3,000 tons. On March 25,2024, "Tianfu Carbon Credits" joint TanShiGuang Carbin, held in "Green future, New Chapter" as the theme of "Tianfu Carbon Credits & TanShiGuang garbage sorting fun activities", through the platform, establish green account positive incentive mechanism, create "Tianfu Carbon Credits" life garbage classification integral incentive application scenarios, and will continue to guide the public to actively participate in garbage sorting recycling depth cooperation.

At the same time, "Tianfu Carbon Credits" and YinGuTanHui, to create online low carbon scenario, in the "YinGu Recycling" mini program to complete recycling, can get carbon points as reward, including waste textiles, waste metals, glass, and waste paper, further promoting the popularization of public garbage classification and recycling, and improving the efficiency of garbage recycling and treatment.

### (g) Shopping mall: Mio Technology together with Xuhui Vanke Mall to create "Natural Playground" ESG application

Mio Technology focuses on the positioning of Xuhui Vanke Mall as a "URBAN PLAY-ROUND" urban entertainment hub. Based on its membership mini program, it has created a carbon reduction application platform called "Natural Playground", which closely connects product design and project concepts. With a dual model of "consumer+enterprise employees", it fully embodies the multi customer characteristics of the business complex. Members of Xuhui Vanke Mall and enterprise employees in the office building can log in to the "Natural Playground" by entering the Xuhui Vanke Mall member mini program, and participants can obtain corresponding energy windmills. All tasks embody the core concepts of low-carbon and green, highlighting the focus on green life, green space, and green transportation. As an employee at Xuhui Vanke Mall, completing online booking, filling out and other carbon reduction and sustainability tasks in the office building can also earn energy windmills. The dual mode of "consumer+enterprise employees" combined with the design of low-carbon scenarios enables "green consumption, low-carbon office, and green life" to be presented in a one-stop manner in personal carbon account applications, truly integrating green, low-carbon, and sustainable into all aspects of daily life. After mall members and employees practice low-carbon behavior, the accumulated energy windmills can be exchanged for green gifts, mall points, and voluntary carbon reduction certificates, providing a triple benefit channel for carbon reduction incentives and enhancing user participation enthusiasm.



Figure 4.3 Application entrance and home page of "Natural Playground"

**(h) Platform: Alibaba Cloud Energy Expert supports the Paris Olympics**

In 2021, Alibaba Cloud launched its SaaS product Energy Expert. After three years of iteration, Energy Expert has carried out digital innovation in the government, enterprises, and communities, providing a systematic path to support low-carbon development of society with low-carbon technology.

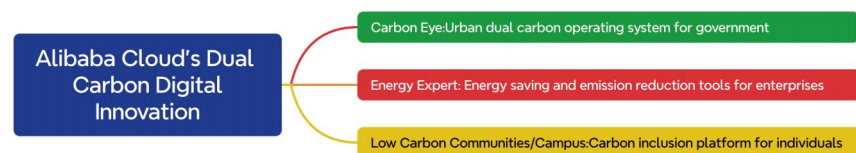


Figure 4.4 Three Major Directions of Alibaba Cloud's Dual Carbon Digital Innovation

For the enterprise end, Energy Expert mainly has three functions: energy consumption management and optimization, carbon emission calculation, and carbon reduction plan. Energy Expert mainly targets individuals in organizations such as communities and campuses, encouraging them to participate in low-carbon behavior and cultivate green awareness. For example, Energy Expert encourages individuals to record and upload their low-carbon behaviors such as green travel, waste recycling and Clean Your Plate Campaign on the platform, accumulate carbon points and exchange low-carbon products, thus forming a positive green cycle.

	Calculation	Reduction
Organizational level	<p>Carbon calculation at the organizational level</p> <ul style="list-style-type: none"> <li>Carbon emission calculation and certification of the organization</li> </ul>	<p>Carbon reduction at the organizational level</p> <ul style="list-style-type: none"> <li>Energy consumption management                             <ul style="list-style-type: none"> <li>Energy management</li> <li>Self-generation management</li> <li>Energy consumption optimization of large equipment</li> </ul> </li> </ul>
Product level	<p>Carbon calculation at the product level</p> <ul style="list-style-type: none"> <li>Carbon footprint calculation and certification of products</li> </ul>	<p>Carbon reduction at the product level</p> <ul style="list-style-type: none"> <li>Proactive carbon reduction suggestions</li> <li>Connect with carbon emission reduction resources</li> <li>Green Marketing</li> </ul>

Figure 4.5 Main functions of Energy Expert

Alibaba Cloud Energy Expert combines artificial intelligence technology with low-carbon technology to assist enterprises in achieving energy conservation, consumption reduction, and low-carbon development. It provides professional one-stop carbon services such as energy management and digital low-carbon certification, helping customers establish sustainable energy-saving and carbon reduction practices from enterprise-level to product-level carbon emission management, ultimately establishing a green and advanced product value and brand image. As of the end of 2023, nearly 3000 small and medium-sized enterprises have used Alibaba Cloud Energy Expert, with an average energy-saving effect of 12%, covering 13 industries such as manufacturing, retail, and agriculture, managing nearly 30,000 IoT devices, and accumulating 226,000 environmental assessment factors throughout the entire lifecycle. Through photovoltaic installation and energy-saving, the platform saves an average of 2 million kilowatt hours of energy per day and calculates the carbon footprint of over 100 different product categories.

At the same time, Energy Expert, as a core strategic product of Alibaba Cloud, also serves multiple sports events including the 2020 Tokyo Olympics, 2022 Beijing Winter Olympics, 2024 Paris Olympics, and 2022 Asian Games, providing various sustainable solutions for large-scale sports events, supporting zero carbon events, and giving voice to China's dual carbon strategy worldwide.

The International Olympic Committee (IOC) has deployed Alibaba Cloud's data-driven sustainable development solution "Energy Expert" to help measure and analyze the electricity consumption of the competition venues for the 2024 Paris Olympics ("Paris 2024"). For the first time in this Olympic Games, information related to power consumption and demand of competition venues will be migrated to a cloud platform. This solution will provide more accurate analysis and more evidence-based power consumption planning for future Olympic Games.

During Paris 2024, "Energy Expert" will be deployed in all 35 competition venues. With this solution, the International Olympic Committee can integrate energy consumption and other related data for the Olympic and Paralympic Games into a concise dashboard, providing a clear view of electricity consumption, emergency power demand, venue capacity, competition information, and on-site weather conditions.

Based on cloud data and Alibaba Cloud's deep learning AI model, "Energy Expert" can provide more accurate analysis and generate predictions and suggestions for specific areas within the venue, such as optimizing power demand to reduce power waste.

In addition, 100 smart meters installed in the operating areas of some competition venues can collect real-time electricity consumption and summarize it into a comprehensive dataset. The real-time electricity consumption of various operational spaces within the venue, such as competition venues, broadcasting and media work areas, technical operation areas and dedicated equipment, catering equipment, and many other temporary operation areas and equipment, will be included. Considering the temperature conditions and real-time usage in different regions at different time periods, the collected dataset may also vary. These detailed datasets provide more accurate background information for the Organizing Committees for the Olympic Games (OCOGs) when referring to energy consumption at the Paris Olympics.

(i) Hotel : Marriott “Eco Challenge” mini program

Marriott Group Greater China has integrated sustainable operations into its company strategy and is committed to the concept and responsibility of sustainable development throughout its operations. At the end of February 2024, Marriott Group teamed up with Alibaba Cloud to upgrade the green and sustainable concept of hotel scenes through digital means. They released an “Eco Challenge” mini program to all regional general managers, encouraging employees to practice green and low-carbon behavior through green challenge tasks.

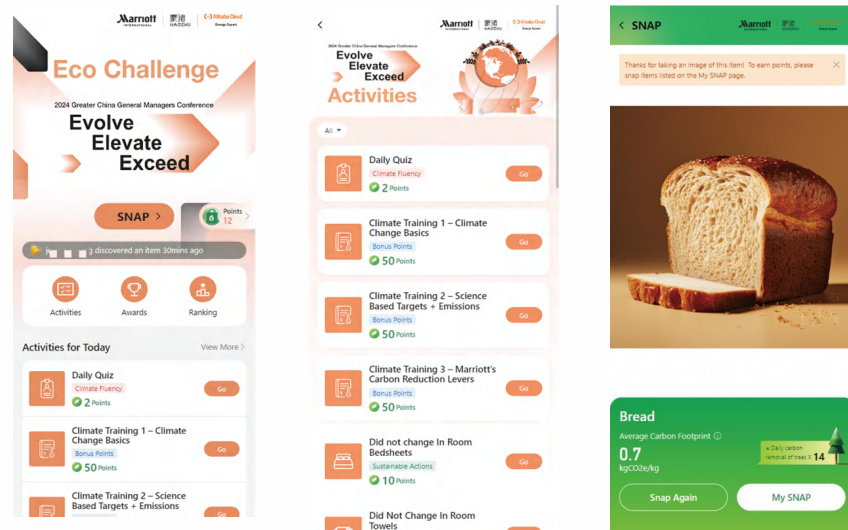
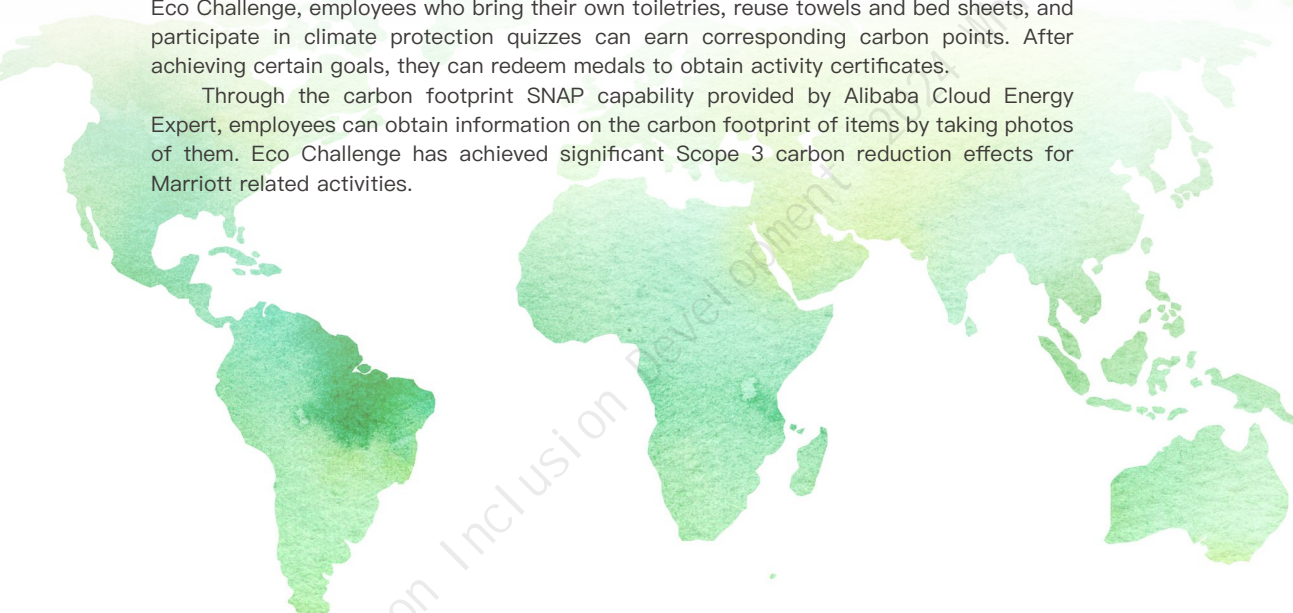


Figure 4.6 Display of Marriott Eco Challenge Mini Program

Eco Challenge is designed and developed by Alibaba Cloud Energy Expert based on Marriott's concept of low-carbon behavior in hotel scenarios and related methodologies. It digitizes low-carbon behavior in hotel scenarios into executable and quantifiable small challenge tasks, exploring the possibility of quantifying the greenness of hotel behavior. In Eco Challenge, employees who bring their own toiletries, reuse towels and bed sheets, and participate in climate protection quizzes can earn corresponding carbon points. After achieving certain goals, they can redeem medals to obtain activity certificates.

Through the carbon footprint SNAP capability provided by Alibaba Cloud Energy Expert, employees can obtain information on the carbon footprint of items by taking photos of them. Eco Challenge has achieved significant Scope 3 carbon reduction effects for Marriott related activities.



## 5. Carbon inclusion innovation and integration

The innovation integration of carbon inclusion is in many aspects in different fields, including innovative technology, digitalization, finance, data governance, AI and different industries. How to use various advanced technologies and tools to promote the development of carbon inclusion mechanism is worth pondering and discussing.

### 5.1 Carbon inclusion and financial innovation

On March 27, 2024, with the consent of the State Council, the People's Bank of China, the National Development and Reform Commission, the Ministry of Industry and Information Technology, the Ministry of Finance, the Ministry of Ecological Environment, the General Administration of Financial Supervision and the China Securities Regulatory Commission jointly issued the Guiding Opinions on "Further Strengthening Financial Support for Green and Low Carbon Development" (hereinafter referred to as the Opinions) in order to implement the major decisions and deployment of the CPC Central Committee and the State Council on carbon peaking and carbon neutrality, do a good job in green finance, and actively support green and low carbon development. The Opinions point out that in the next five years, an internationally leading financial support system for green and low-carbon development will be basically established, financial infrastructure, environmental information disclosure, risk management, financial products and markets, policy support system, and green finance standard system will be continuously improved, green finance regional reform will be orderly promoted, international cooperation will be closer, and various factor resources will be orderly gathered in the green and low-carbon field. By 2035, various economic and financial green and low-carbon policies will be promoted in a coordinated and efficient manner, the standard system and policy support system for financial support of green and low-carbon development will become more mature, and the functions of resource allocation, risk management, and market pricing will be better utilized. We should steadily and orderly explore the development and reform path of green finance with regional characteristics, and do a good job in summarizing, evaluating, and promoting experience in the pilot zone. Orderly carry out the upgrading and expansion of the green finance reform and innovation pilot zone. Carbon inclusion, as a green development model with regional characteristics, will benefit from the release of this opinion. Financial support for carbon inclusion can be reflected in providing financial products and services, promoting the construction of carbon inclusion markets, and strengthening financial innovation and cooperation.

On October 12, 2024, in order to implement the decision and deployment of the CPC Central Committee and the State Council on comprehensively promoting the construction of a beautiful China, and help the construction of a beautiful China with high-quality development of green finance, the People's Bank of China, the Ministry of Ecological Environment, the State Administration of Financial Supervision, and the China Securities Regulatory Commission jointly issued the Opinions on "Giving Play to the Role of Green Finance in Serving the Construction of a Beautiful China" (hereinafter referred to as the Opinions), which clearly pointed out the need to develop green consumer finance business. Support the practice of green and low-carbon lifestyles, explore the establishment of personal carbon accounts, and promote innovation in the "carbon inclusion" system. Actively carry out green consumption credit business, encourage financial institutions to expand the application scenarios of green consumption loans around daily behaviors such as "clothing, food, housing, transportation", develop personal carbon finance products and services, incorporate

personal green low-carbon behavior carbon reduction information, form convertible carbon credits, and provide preferential credit limits, interest rates, and value-added services.

#### (a) Provide financial products and services

Financial institutions can provide financial products and related services to companies that practice carbon-inclusion mechanisms.

##### Carbon inclusion credit

Financial institutions can launch special credit products for carbon inclusion projects. For example, to provide preferential loans for carbon inclusion projects such as energy saving renovation, renewable energy installation, and green transportation. At the same time, financial institutions can evaluate and approve the loan quota according to the emission reduction or environmental benefits of carbon inclusion projects, and encourage more people to participate in carbon emission reduction actions.

##### Carbon inclusion financial products

Develop carbon inclusion financial products to attract investors to invest money into carbon inclusion environmental benefit projects. These financial products can invest in renewable energy projects, energy efficiency improvement projects, forest carbon sink projects, etc., providing investors with certain returns, while also promoting carbon emission reduction and sustainable development. Financial institutions can cooperate with professional carbon asset management companies to evaluate and verify the emission reduction of carbon inclusion projects, and use them as one of the income sources of wealth management products to improve the attractiveness and credibility of the products.

##### Carbon inclusion insurance

Carbon inclusion insurance products were launched to provide risk protection for carbon inclusion projects. For example, provide equipment damage insurance for renewable energy projects and traffic accident insurance for green transportation projects. These insurance products can reduce the risk in the project implementation process and improve the stability and sustainability of the project.

#### (b) Promote the development of carbon inclusion markets

##### Participate in the construction of carbon inclusion trading platform

Financial institutions can participate in the construction and operation of the carbon inclusion trading platform and provide financial services for the emission reduction trading of carbon inclusion projects. For example, to provide transaction settlement, fund custody, risk management and other services to ensure the security, efficiency and transparency of transactions. They can also cooperate with developers, operators and investors of carbon trading projects to jointly promote the development and improvement of carbon trading platform and improve the activity and liquidity of the market.

##### Carry out investment and financing services for carbon inclusion projects

Financial institutions can provide investment and financing services for carbon inclusive projects, including equity financing, bond financing, project financing, etc. By investing in carbon inclusion projects, financial institutions can obtain long-term stable returns, while also promoting carbon reduction and sustainable development. At the same time, we can cooperate with government departments, social organizations, and enterprises to jointly establish investment and financing tools such as carbon inclusion funds and green bonds to provide financial support for carbon inclusion projects.

Promote the development of carbon inclusion standards and a certification system

Financial institutions can participate in the construction of carbon inclusion standards and certification systems, and provide a professional financial perspective and methods for the evaluation and certification of carbon inclusion projects. For example, financial institutions can evaluate and certify the emission reduction, environmental benefits, social benefits and other factors of carbon inclusion projects, so as to provide a basis for the investment, financing and trading of projects.

### (c) Strengthen financial innovation and cooperation

#### Explore the innovative model of carbon inclusion finance

Financial institutions can actively explore the innovative mode of carbon inclusion finance, combine emerging technologies such as blockchain, big data and artificial intelligence, to provide more convenient, efficient and personalized financial services for carbon inclusion projects. Cooperate with technology companies and innovative enterprises to jointly develop innovative products and services of carbon inclusion finance, and promote the development and innovation of carbon inclusion finance.

#### Strengthen cooperation among financial institutions

Financial institutions can strengthen cooperation to jointly promote carbon inclusion development. For example, banks, securities, insurance and other financial institutions can jointly carry out investment and financing and risk management services for carbon inclusion projects, so as to realize resource sharing and complementary advantages.

#### Promote the integration of finance and other industries

Financial institutions can strengthen their integration with other industries to jointly promote carbon inclusion development. For example, financial institutions can cooperate with energy enterprises, transportation enterprises and environmental protection enterprises to carry out investment, financing and risk management services for carbon inclusion projects, so as to realize industrial coordination and sustainable development.

### (d) Integrated innovation cases

In order to explore long-term incentives for market-oriented development, Wuhan actively promotes the connection between carbon inclusion mechanism and green finance, gives full play to the financial attribute (leverage) of carbon inclusion emission reduction as carbon credit (carbon asset), and jointly promotes the construction of green consumption system. In March 2024, Wuhan initiated the "distributed carbon account" mode, and cooperated with China Merchants Bank Wuhan Branch to issue the country's first low-carbon green card integrating bank account, personal carbon account and city bus card functions. When citizens hold this card, they can not only enjoy convenient travel services, but also accumulate the corresponding emission reduction and exchange the business incentives provided by China Merchants Bank. The so-called "distributed carbon account" means embedding the personal carbon account built by the government into the own platform of enterprises, giving enterprises the ability to collect carbon emission reduction online. This model innovation not only solves the problem that financial institutions have no accounting basis for their own carbon accounts, but also provides diversified channels for citizens to participate, which greatly improves the conversion rate of personal carbon reduction value. In addition, it also provides a carbon data basis for financial institutions to explore the integration of green finance and financial inclusion. At present, UnionPay (Hubei), Minsheng Bank Wuhan Branch and other financial institutions have also joined the development of distributed carbon accounts, and actively explore the combination of old exchange for new, new energy vehicles consumer loans.

## 5.2 Carbon inclusion and data governance

Data governance is a series of activities and processes that manage and control data assets, aimed at ensuring the quality, availability, security, and compliance of data to achieve the maximum value of data. On December 19, 2022, the Central Committee of the Communist Party of China and the State Council issued the "Opinions on Building a Data Infrastructure System to Better Play the Role of Data Elements" (hereinafter referred to as the Opinion). The Opinion points out that it is necessary to explore property rights and market systems that are conducive to data security protection, effective utilization, and compliant circulation, improve the market system and mechanism of data elements, and promote the formation of new production relations that are compatible with digital productivity. Persist in sharing and releasing value dividends. Reasonably lower the threshold for market entities to obtain data, strengthen anti-monopoly and anti unfair competition, and form a development model that is regulated by law and shares dividends. At the same time, promote the adjustment and optimization of data element supply, and improve the quantity and quality of data element supply. Establish a trustworthy data circulation system to enhance the availability, trustworthiness, circulation, and traceability of data. Realize dynamic management of the entire process of data circulation and activate the value of data in compliant circulation and use.

Data governance plays a crucial role in the field of carbon inclusion, which involves many aspects, including data collection, storage, analysis and application. Effective data governance is the key to the stable operation of the carbon inclusion system.

### Data acquisition and monitoring

The Internet of Things, big data and other technologies are used to realize the accurate collection and monitoring of low-carbon behaviors of individuals and enterprises. For example, public transportation data and energy use data can be recorded through smart devices to ensure the authenticity and reliability of emission reduction. Establish a data monitoring platform to monitor and evaluate the implementation of carbon inclusion projects in real time, and find out and adjust problems in time.

### Data security and privacy protection

Strengthen the security management of carbon inclusion data, establish a sound data security protection system, and prevent data leakage and abuse. Strictly abide by the privacy protection laws and regulations, ensure that the carbon inclusion data of individuals and enterprises are used under the premise of legal compliance, and protect users privacy rights and interests.

### Data analysis and application

Conduct in-depth analysis of carbon inclusion data, mine valuable information, and provide data support for policy formulation and project optimization. For example, analyze the characteristics of low-carbon behavior in different regions and different populations, and develop targeted incentives. The data analysis results are used to evaluate the implementation effect of the carbon inclusion system and provide a basis for further improvement and improvement of the system.

### Integrated innovation cases

NaaS Carbon Inclusion SaaS Platform, based on blockchain technology, uses digital technologies such as big data, the Internet of Things, and artificial intelligence to create, register, and manage all relevant data on low-carbon behaviors among residents. It actively promotes carbon inclusion and emission reduction transactions, builds a complete and

trustworthy green finance carbon inclusion industry loop, and forms a secure and trust worthy digital carbon inclusion platform. The platform can provide services for a wide range of C-end users, as well as a complete set of carbon inclusion services for enterprises and their employees.

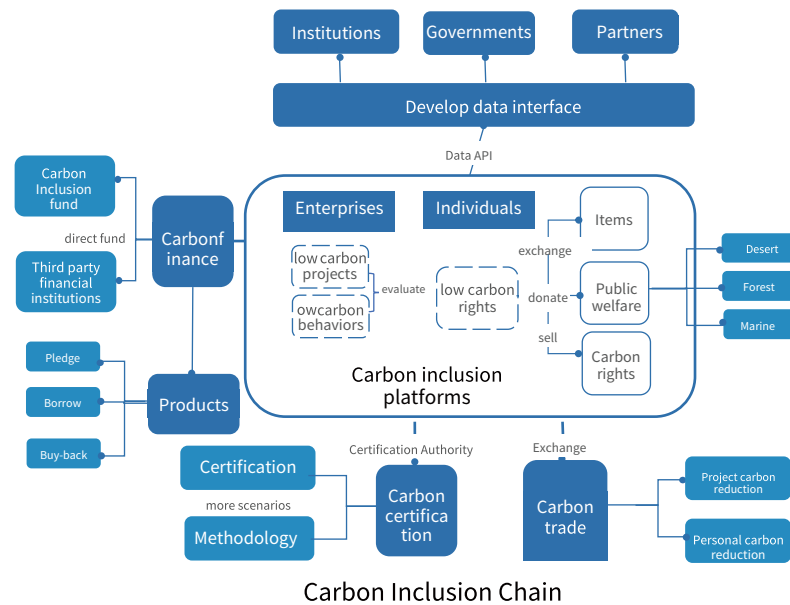


Figure 5.1 Framework diagram of the NaaS SaaS Platform

### 5.3 Carbon inclusion with AI

#### (a) Smart emission reduction recommendations

By analyzing the energy use data and travel data of individuals and enterprises, the AI algorithm is used to provide users with personalized emission reduction suggestions. For example, lower-carbon travel methods are recommended based on users daily travel habits.

#### (b) Intelligent management of carbon inclusion platform

Use AI technology to realize the intelligent management of the carbon inclusion platform, and improve the operation efficiency and service quality of the platform. For example, automatic audit of emission reduction projects, rapid processing of user feedback, intelligent recommendation of incentives, etc. Through machine learning algorithm, the rules and incentive mechanism of carbon inclusion system are continuously optimized to make it more scientific, reasonable, efficient and feasible.

#### (c) Integrated innovation cases

On December 8, 2023, Carbonstop released "Carbon AI" in the "China Corner" of COP 28, which is an innovative achievement based on artificial intelligence technology and can be regarded as the "ChatGPT" in the carbon field. This model includes carbon footprint data for over ten years, enterprise Scope 1-3 data, accumulation of thousands of product carbon footprint projects, publicly available SBTi and ESG data, providing over a thousand terms and policy interpretations, tens of thousands of case studies and insights analysis, and offering more comprehensive carbon knowledge, industry dynamics, and policy regulations. Carbon AI is also a fast carbon calculation tool that helps with carbon emissions accounting in various scenarios such as enterprises, products, projects, and activities, making it easy to complete carbon calculations and understand carbon emissions. At the same time, Carbon AI, as a carbon cloud assistant, can complete user instructions, build models, and analyze carbon data in the carbon cloud; In the future, they will provide more personalized carbon data analysis services based on big models and intelligent modeling of industry data.



# 06

## Carbon inclusion international case analysis



## 6. Carbon inclusion international case analysis

Compared with the vigorous development of carbon inclusion in China, the international attention to "carbon inclusion" is relatively low for several reasons. Firstly, in economically developed Western countries, the public has a good awareness of green environmental protection, and their participation of green living have been well demonstrated, which has been put into practice more often. Especially in terms of consumption, the public is more inclined to purchase green products, such as organic food, environmentally friendly household items, renewable energy products, etc. They pay attention to the environmental label of their products, choose environmentally friendly products, and reduce the use of disposable items. But they pay less attention to the concept of "carbon inclusion" itself.

In countries in the global South with relatively average and backward economies, due to differences in economic development level, cultural background, education level, etc., there are also differences in the level of understanding of carbon inclusion, which requires more time and resources to promote and popularize. In addition, most countries generally have problems such as limited technological level, lack of funding, and insufficient policy support. These factors have constrained the development of carbon inclusion, making it difficult for most countries to promote it.

In addition, the biggest problem for both Western countries and countries in the global South is that digital technology is relatively backward compared to China. Digital technology is the prerequisite and guarantee for the development of carbon inclusion mechanisms. The scenarios, data collection, data calculation, and incentive methods for public carbon inclusion require the support of digital technology to ensure the effective operation of the entire carbon inclusion mechanism.

### (a) UK: Green Deal Cashback Scheme

On March 30, 2023, the UK launched the "Green Deal Cashback Scheme", which is a typical carbon inclusion mechanism. The plan encourages homes to install renewable energy equipment such as solar panels to get cash back by exporting excess power to the grid. The specific thing is that after the solar panels are installed in the home, and the electricity generated to meet their own needs, the excess power can be input to the national grid. The power company pays a certain cash return to the transmission home based on the input quantity of electricity. The plan also provides a range of subsidies and preferential policies, such as installation subsidies and tax breaks, to reduce the cost of installing renewable energy equipment in homes.

The launch of the scheme has greatly promoted the development of renewable energy in the UK and increased the proportion of renewable energy used by households. Since the implementation of the scheme, the number of solar panels installed in the UK has increased significantly, and the number of electricity generated from renewable sources as a percentage of total electricity generation has also increased. In addition, the scheme increases public awareness and participation in climate change and encourages people to adopt a more environmentally friendly lifestyle.

## (b) Japan: Eco-point System

Japans "Eco-point" is a carbon inclusion mechanism that encourages public participation in environmental actions through points rewards. The system covers a number of fields, including energy conservation, emission reduction, resource recovery and so on. This system has great similarity with the carbon inclusion mechanism currently promoted in China. The specific methods are as follows: the public can obtain corresponding ecological points when participating in specific environmental protection actions, such as buying energy-saving appliances, using public transportation, garbage sorting, etc. These points can be exchanged for merchandise at designated stores or for discounts on services. The government and enterprises cooperate to jointly promote the implementation of the system. Companies provide discounts on products and services, while the government is responsible for promoting and promoting the system, and giving certain support and rewards to the participating companies.

The system has effectively promoted the Japanese public, improved the utilization of resources, and reduced energy consumption and greenhouse gas emissions. According to statistics, since the implementation of the system, Japans resource recycling rate has increased significantly, and energy consumption and greenhouse gas emissions have also decreased. At the same time, the system also promotes the environmental protection innovation and sustainable development of enterprises, and promotes the green transformation of the Japanese economy.

## (c) Thailand: Carbon Neutrality 4 All

On 13 August 2024, the Thailand government launched a new carbon trading platform designed to support the Small and Medium-sized Enterprises (SME) and MICE (Meeting, Incentives, Conferencing and Exhibition) sectors towards sustainability.

The new platform, called Carbon Neutrality 4 All, has a launch in Bangkok, marks a milestone in the countrys efforts to achieve net zero carbon emissions. The platform is the result of cooperation between five key organizations: the Chamber of Commerce and Trade Commission of Thailand, the Central Group, the Ministry of Interior of Thailand, Thailand Convention and Exhibition Bureau (TCEB) and the Tourism Authority of Thailand (TAT). These partners signed a memorandum of understanding to jointly promote this initiative designed to make sustainable activities a reality in Thailand. The platform is designed to meet the needs of companies looking to trade carbon credits in small and medium-sized batches. It allows event organizers to obtain high-quality carbon credits from proven carbon dioxide and methane emissions reduction projects to contribute to the countrys broader environmental targets.

The "Carbon Neutrality 4 All" platform provides a range of tools to help event organizers calculate and offset their carbon emissions. One prominent feature is the CERO application, which facilitates the calculation of the carbon footprint by connecting to the energy control system at the mobile site. In addition, the platform is integrated with an AI-driven mobile app for participants, allowing them to track the carbon footprint of their travel and food consumption during the event and participate in green campaigns.

The carbon credits traded on the platform are generated through a residential waste management project supervised by the Ministry of the Interior and certified by the Thailand Greenhouse Gas Management Organization (TGO). This approach not only supports environmental sustainability, but also generates revenue for the local communities involved in these programs.

## (d) Uber: Green Future Program

Uber is committed to achieving net zero emissions across all lines of business (travel, food delivery, freight) worldwide by 2040, and achieving 100% of passengers worldwide in zero-emission vehicles, micro-vehicles or public transport.

Uber has formed a partnership with Hertz, one of the worlds largest car rental platforms, and will offer up to 50,000 pure electric Teslas to Uber drivers in the U. S. and Canada by 2023. Since October 2021, Teslas leased through Hertz has now made more than 5 million trips in the United States and traveled more than 40 million miles of pure electric range. As the program evolves, the total amount of emissions avoided has increased accordingly. As of August 1,2022, the United States has avoided more than 19,900 tons of driving carbon dioxide emissions. In addition, Uber provides new additional revenue to drivers driving more environmentally friendly and electric vehicles in the United States and Canada — \$1 per pure electric vehicle driver.

Uber has launched Uber Planet in Mexico and other Latin American countries, allowing users to ride a hybrid or electric car to reduce their carbon footprint. In Mexico, users can support the development of the Uber Planet project by paying an extra 0.37 Mexican peso per kilometer.





# 07

## Suggestions and future prospects



## 7. Suggestions and future prospects

### (a) Introduce a carbon inclusion mechanism at the national level and encourage local governments to establish voluntary carbon emission reduction markets

Since the announcement of the dual-carbon target, the national level has issued a number of carbon neutrality, carbon peaking policies, various industries are also actively responding to the national policy, actively, steadily and orderly promote China dual-carbon target. But in the field of carbon inclusion, there are still relatively few national policies. It is suggested that the state should introduce the top-level design policy of carbon inclusion mechanism as soon as possible, make an overall plan for the construction of carbon inclusion mechanism system, and improve the corresponding plans and management methods. At the same time, local governments are encouraged to establish voluntary carbon emission reduction markets, take into account local economic structure, industrial structure and other factors, adapt measures to local conditions, explore a carbon inclusion mechanism in line with the local future green development plan, and build it. Through the construction of voluntary carbon emission reduction carbon market, a closed loop of carbon inclusion trading system will be formed, so as to drive more enterprises, shopping malls, schools and communities to participate in it.

### (b) Develop more carbon inclusion scenario methodology

Although various regions have been actively promoting the development of carbon inclusion methodologies in the past two years and have made good progress, the overall number of methodologies is still relatively small, especially for scenario based methodologies. Currently, only cities such as Wuhan, Shanghai, Shenzhen, and Chongqing have announced them, and they mainly focus on green travel, with a serious lack of scenario coverage. At present, all green scenarios of carbon inclusion are basically provided by Internet giants, and the public participation base is huge. The development of scenario methodology and business cooperation with Internet giants can not only improve the public awareness of carbon inclusion, but also greatly promote public participation.

### (c) Encourage more enterprises to participate in carbon inclusion

From the perspective of the current development path and achievements of carbon inclusion, enterprises are the cornerstone of carbon inclusion mechanism. Enterprises play an important role in the scenario provider, right provider, or activity participation. How to improve the enthusiasm of enterprises to participate requires local governments to seriously think and treat in the construction of carbon inclusion. It is suggested that local governments provide special fund support to enterprises that actively participate in the construction of carbon inclusion emission reduction, and further improve the trading mechanism of carbon inclusion emission reduction, so as to create economic benefits for enterprises. In addition, through publicity and guidance of employees to enjoy green life, regularly hold carbon inclusion activities for enterprises, and organize enterprise exchange activities, so as to maximize the role of enterprises to participate in the construction of carbon inclusion mechanism.

#### **(d) Strengthen collaboration and interconnection between platforms**

At present, governments and related enterprises in various regions of China have joined the construction of carbon inclusion and carbon accounts, and numerous enterprises have emerged in the market relying on scenario based carbon accounts and government led carbon inclusion platforms. Promoting the interconnection between carbon inclusion platforms and enterprise carbon accounts in various regions, achieving the sharing and exchange of carbon emission reduction data, and strengthening cooperation among platforms are important measures to promote the construction of carbon inclusion system and achieve the "dual carbon" goal. Especially on the data and technology sides, efficient circulation and sharing of data can be achieved through interconnectivity mechanisms, avoiding duplicate collection and storage. The platform can share technological achievements in carbon reduction calculation models, data analysis tools, user interface design, and other aspects, improving the technical level of the entire carbon inclusive field. I hope that in the future, data sharing, technological cooperation, and resource integration between carbon inclusion platforms can be achieved, improving the impact and effectiveness of carbon inclusion efforts, and making positive contributions to achieving carbon peaking and carbon neutrality goals.

#### **(e) Promote carbon inclusion exchanges and share industry development experience**

Promoting carbon inclusion exchanges and sharing industry development experience is crucial to promoting the sustainable development of carbon inclusion system. Regularly hold carbon inclusion industry summits and forums, inviting government departments, business representatives, experts and scholars, social organizations, and other parties to participate. These activities can provide a platform for industry professionals to exchange and collaborate, sharing the latest policy developments, technological innovations, and practical experiences. Establish a carbon inclusion industry association or alliance, bringing together enterprises, institutions, and individuals within the industry to jointly promote the development of carbon inclusion. Conduct case studies on successful carbon inclusion projects, summarize their experiences and practices, and share them through various channels. We can write case reports, create video tutorials, and hold online and offline sharing sessions to allow more people to understand and learn about these successful cases.

#### **(f) Strengthen carbon education on campus and popularize the knowledge for elderly people**

In the analysis of the public awareness survey on carbon inclusion in Chapter 3, it can be seen that the participation rate of people under 18 and over 60 years old is very low, and only 2.29% of users learn about carbon inclusion through campus promotion, indicating that student users and elderly people over 60 years old have less understanding of carbon inclusion. In the future, it is recommended to popularize and promote carbon inclusion knowledge in schools, and at the same time, conduct carbon inclusion knowledge promotion and education for middle-aged and elderly people in communities, so that more young people can develop green living habits from an early age, and more middle-aged and elderly people can change into green living habits and benefit from them. In terms of campus practice, Hebei University of Environmental Engineering, as the only undergraduate university in China that provides ecological environment education, has launched a practical case of

carbon inclusion on campus. Among them, the school's carbon inclusion features include converting "green points" into graduation credits for students, setting reference standards by grade, incorporating them into student awards and member promotion policies, and exchanging physical items such as cultural products, environmental protection gifts, and campus coupons in the school. This approach has planted green seeds in students' hearts. Hope that in the future, more carbon inclusion activities can penetrate into schools and communities, and encourage student groups and middle-aged and elderly people to actively participate in carbon inclusion.

#### **(g) Strengthen international exchanges and explore more international cooperation on carbon inclusion**

Actively participate in international exchanges and cooperation in the field of carbon inclusion, learn from international advanced experience and practices. We can organize delegations to participate in international conferences and exhibitions, and exchange and cooperate with international peers. At the same time, international experts can also be invited to give lectures and training in China, sharing the latest international research results and practical experience. Through international exchanges and cooperation, we can enhance the internationalization level of China's carbon inclusion system and contribute to the global response to climate change.

Looking ahead to the future, the development prospects of carbon inclusion mechanisms are full of both challenges and opportunities. With the joint efforts of the government, enterprises, and the public, the carbon inclusion mechanism will continue to improve and develop, laying a solid foundation for the comprehensive formation of China's green lifestyle and the early realization of the dual carbon goals, while also contributing to the achievement of global climate goals.



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