

Chapter 1

Introduction



1.1 Introduction

In light of the directives of the 18th National Congress of the Communist Party of China (CPC) and the Third Plenary Session of the 18th Central Committee of the CPC, China shall vigorously press ahead with the construction of ecological civilization, let market play a decisive role in resource allocation, and actively carry out the pilot program for the carbon emissions trading scheme (ETS). In 2011, the National Development and Reform Commission (NDRC) released the *Notice on Carrying out the Work of Carbon Emissions Trading Pilot Program in China* (No. 2601 [2011]), which designates seven municipalities/provinces¹ to build an ETS that accords with China's special situations. After more than 2 years' of preparation, Guangdong ETS officially came online on December 19, 2013, and became the first one that had run through the entire operational process by July 15, 2014, including companies' emissions reporting, verification, allowances allocation and auction, and companies' compliance. As of December 1, 2015, China (Guangzhou) Emissions Exchange—an allowances bidding platform—had traded about 23.20 Mt of allowance—accounting for about 35.7% of the total trading volume of all pilot areas; and its accumulated revenue of 960 mln yuan held about 43.3% of the total revenue of all pilot areas, highlighting its position as the largest carbon market in China.

Guangdong carbon market has been so far operating smoothly. Local companies have learned more about the ETS and accepted this new environment governance mechanism. The covered enterprises are fairly observant, over 80% of them have achieved emissions cutbacks. Guangdong ETS has made several new breakthroughs, e.g., by following the principle of openness and transparency, it is the first one that made public the targets for setting a cap on total allowances; the aggregate allowances trading volume and revenue on the primary and secondary carbon

¹The seven pilot areas are made up of the provinces of Guangdong and Hubei, and the municipalities of Beijing, Tianjin, Shanghai, Chongqing, and Shenzhen.

markets rank the first place among all pilot areas; the entire province has become highly aware of the importance of emissions reduction; and more and more labor force has flocked into the low-carbon service sector. Besides, Guangdong took the lead in exercising allowances auction, drawing new entrants into emissions regulation, creating a carbon fund with the allowances trading revenue, and constantly innovating carbon finance products.

1.2 Formation Process of Guangdong ETS

Implementation of the ETS pilot program is a long-term endeavor. In light of the Guangdong Provincial Government Agenda, the ETS pilot program was carried out in three phases during the 12th Five-Year-Plan period (2011–2015):

Phase 1 (2012): Conduct preliminary researches, develop an implementation plan, and draw up the measures for allowances administration and transaction.

Phase 2 (2013): Put in place the ETS administration measures and implementation rules, develop an allowances allocation plan, build an Electronic Information System (EIS), and finally kick off the online transaction.

Phase 3 (2014–2015): Carry out the transaction activities in an all-round manner, assess the effect of relevant mechanisms, and plan for the work of emissions trading during the 13th Five-Year-Plan period (2016–2020).

1.2.1 Landmark Events

- In October 2011, the NDRC released the *Notice on Carrying out the Work of Carbon Emissions Trading Pilot Program in China* (No. 2601 [2011] NDRC Climate Change Department), which designates Guangdong and Hubei provinces and five municipalities to join in such pilot program.
- In May 2012, in order to absorb the ETS experiences both home and abroad, Guangdong competent departments, research institutions, and emissions exchanges, led by Guangdong Provincial Development and Reform Commission (GD DRC), visited UK for investigations and study, and then returned to China to exchange with Shanghai and other pilot areas.
- In August 2012, Zhuhai City of Guangdong hosted a seminar on the carbon emissions trading pilot program, which was attended by the leaders and experts from the NDRC Climate Change Department and other pilot areas. On this occasion, Guangdong introduced its ETS administration measures, the guidelines for companies' emissions verification and relevant provisions to draw comments and suggestions from other participants.

- In September 2012, at the opening ceremony of China (Guangzhou) Emissions Exchange, Guangdong Governor Zhu Xiaodan announced the official launching of Guangdong ETS pilot program. Xie Zhenhua, Deputy Director of NDRC; and Xu Shaohua, Executive Vice Governor of Guangdong, respectively, expressed their expectations for Guangdong ETS in their speeches.
- In June 2013, Xie Zhenhua, Deputy Director of NDRC, arrived at Shenzhen to preside over a special conference on the ETS pilot program joined by the representatives from all pilot areas. Xu Shaohua, Executive Vice Governor of Guangdong, pledged to kick off the emissions allowances trading by the end of the year.
- In July 2013, the Legal Affairs Office of Guangdong Government began to solicit public opinions for *Guangdong Carbon Emissions Allowances Administration and Transaction Measures*.
- In September 2013, the Guangdong Government held a special conference. Xu Shaohua, Executive Vice Governor, presided over a joint session on low-carbon emissions, where he listened to the report from GD DRC on the implementation progress of the Guangdong ETS pilot program.
- In November 2013, GD DRC released the *Notice on Carrying out the Work for Guangdong First Emissions Allowance Allocation* (for trial), and the name lists of reporting companies and covered enterprises.
- On December 16, 2013, Guangdong held an allowances auction—the first carbon market did so in China—fulfilling a trading volume of 3 Mt; yet the application volume on the same day was above 5.07 Mt, marking a shortfall in allowances supply.
- On December 19, 2013, Guangdong ETS officially came online, with the first-day trading volume hitting 120,029 tons and a total turnover of around 7.22 mln yuan. The strike price topped at 61 yuan/t and lowered at 60 yuan/t.
- In July 2014—deadline of the 2013 Compliance Period for Guangdong-based covered enterprises (the first ones under the ETS regulation), the companies' compliance rate hit high at 98.9%, and the allowances compliance rate was as even higher at 99.97%.
- In August 2014, GD DRC issued the *Allocation Plan of Guangdong's Carbon Emissions Allowances in 2014*, which makes public the name list of the covered enterprises and new entrants (including those expanded and rebuilt), and the allowances' calculation methodologies for 2014 Compliance Period.

1.2.2 Relevant Policies and Regulations

Since the ETS pilot program was kicked off, Guangdong Government has unleashed a slew of corresponding regulations and rules. As of December 30, 2015, a total of 11 policy papers were introduced to provide an institutional guarantee for the smooth operation of the ETS.

- On September 7, 2012, Guangdong Government released the *Notice on The Implementation Plan for Carrying out the Work for Guangdong Pilot Carbon Emission Trade Scheme* (No. 264 [2012] GD GOV), which presents the guidelines and objectives for the pilot program, and lays out overall work arrangement.
- On November 25, 2013, GD DRC issued the *Notice on Carrying out the Work for Guangdong First Emission Allowance Allocation (For Trial)* (No. 3537 [2013] GD DRC RES & ENV), which shows the list of the first batch of covered enterprises and new companies (including those expanded and rebuilt).
- On January 15, 2014, the 17th Session of the Standing Committee of the Twelfth Guangdong People's Congress adopted the *Temporary Measures for Guangdong Carbon Emission Management* (No. 197 GD GOV), which was put into effect since March 1, 2014.
- On February 28, 2014, GD DRC issued the *Notice on Carrying out the Work for Emission Reporting and Verification of Companies in 2013* (No. 573 [2014] GD DRC RES & 1ENV), which made public the first batch of reporting companies and covered enterprises.
- On March 18, GD DRC issued the *Notice on the Provisions for Emission Reporting and Verification of Companies (For Trial)*, the official *Provisions for Emission Reporting and Verification of Companies (For Trial)*, and the *Emission Reporting Guidelines for Companies (For Trial)*.
- On March 20, 2014, GD DRC issued the *Guangdong Carbon Emission Allowance Management and Implementation Rules (For Trial)*, which clearly provides for allowance allocation, final settlement, and transaction.
- On June 9, 2014, GD DRC issued the *Notice on Urging covered enterprises to Pay off Their Emission Allowances* in 2013, which asked all these companies to register in Guangdong ETS and submit their allowance application and pay off the fees before July 15, 2014. GD DRC also released the *Adjustment Program for Emission Allowance Allocation* in 2013.
- On August 18, 2014, GD DRC issued the *Notice on the Implementation Program for Guangdong Emission Allowance Allocation* in 2014. In order to cope with changing economic situations and production fluctuations of enterprises, GD DRC decided to adjust 2014 allowance allocation by consulting with the assessment report of Allowance Allocation Assessment Panel, listening to the feedbacks from covered enterprises, and borrowing the experiences from both domestic and foreign carbon markets.
- On September 5, 2014, Guangdong Government made public the list of the first batch of recommended emission verification institutions, in light of the *Temporary Measures for Guangdong Carbon Emission Management* (No. 197 GD GOV), and through expert review and comprehensive assessment.
- On September 18, 2014, with the authorization of GD DRC, Guangzhou Carbon Emissions Exchange decided to launch the first allowance auction on September 26, 2014; the total allowances would be 2 Mt, in light of the *Temporary Measures for Guangdong Carbon Emission Management* (No. 197 GD GOV),

and Guangdong Carbon Emission Allowance Allocation Program in 2014 (No. 495 [2014] of the Climate Change Department of NDRC).

- On July 13, 2015, GD DRC issued the Notice on Guangdong Carbon Emission Allowance Allocation Program in 2015.

1.3 Experiences and Effects of Guangdong ETS

Guangdong is a leading developed province in China and also an epitome of the Chinese economic society, because of its unbalanced local economic growth, an arduous task for cutting carbon emissions and a complete industrial structure. In other words, the problems that Guangdong encounters in designing and operating an ETS shall be considered and resolved when building a nationwide ETS. Therefore, Guangdong will be a precursor for a nationwide ETS, with distinct values hardly outpaced by those pilot municipalities. Moreover, being one of the two provinces joining in the pilot program, Guangdong will set an example for other developed provinces. In short, a summarization of Guangdong's experiences in ETS design and operation is not only favorable for the province to refine management and trading of emission allowances, but also of far-reaching impact on forging ahead with a nationwide ETS.

- (1) Building a clear-cut and forceful organizational structure, and constantly improving legislations.

Guangdong Provincial Committee of CPC and Government attach high attention to building an ETS. The low-carbon leading group, which is directly under the guidance of the Governor, maps out a general plan for carrying out the pilot program; while the Division of Climate Change of GD DRC takes charge of ETS design and operation. In order to smoothly carry out this initiative pilot program, GD DRC rallies intelligent sources from multiple academic sectors. It successively set up the ETS Research and Design Group, Allowance Management and Trading Workshop, and Allowance Allocation Assessment Panel. These entities contribute their ideas and thoughts in public policy management, jurisprudence, economics, environmental science, financial studies, statistics, and system software R&D. Thanks to these efforts, Guangdong has formed a working mechanism that enables all stakeholders, e.g., decision-making organs, research institutions, industry associations, and covered enterprises, to join in the formation of ETS, which has ensured a scientific, rational, and practical ETS design.

With regard to supporting laws and regulations, the Guangdong Government has come out with a slew of regulations and rules on the ETS, so as to create a solid legal basis for carrying out this pilot program. In January 2014, the Guangdong Government issued the Temporary Measures for Guangdong Carbon Emission Management (For Trial), which serves as a guideline for building the ETS. On this basis, GD DRC issued the Guangdong Carbon Emission Allowance Management

and Implementation Rules (For Trial), and the Implementation Rules for Guangdong Corporate Emission Reporting and Verification of (For Trial), and released the emission reporting guidelines and verification specifications. Such regulations, together with the earlier rules on emission trading, have constituted an initial legal framework for ETS that is scientific, standardized, and carrying the characteristics of Guangdong.

- (2) Maintaining exchanges and cooperation during the entire formation process of Guangdong ETS.

During the preliminary stage of ETS research and design, we were committed to learning the fundamental theories and global experiences. In addition to desk research, we visited EU, US, Japan, and Australia to learn from the front-line ETS experts and policy-makers. By following the global “cap-and-trade” principle, and considering the characteristics of Guangdong socio-economy and emission structure, we able to start the “top-down design” of Guangdong ETS.

While the ETS is being operated, we have been open to exchanges with the relevant research institutions, companies, and global experts, following the global carbon market trends, borrowing the strengths of foreign carbon markets to make up for our weaknesses and mitigate market risks. We have been closely watching the ETS operation so as to make the timely adjustment; interacting with other domestic carbon markets, and studying a scheme for linking Guangdong with other carbon markets. Our experts have maintained regular contacts with their counterparts in EU and UK, and held discussions with the experts of London School of Economics and Political Science (LSE) on effective assessment and policy adjustment.

Guangdong ETS is expected to be open and transparent from design to operation, and exhibit its global impact during interactions with the carbon markets both home and abroad. At the governmental level, the Guangdong Government conducted in-depth exchanges with the House of Commons Environmental Audit Committee and California Carbon Office on the implementation effects of policies. At the nongovernmental level, Guangdong Low-Carbon Economy Promotion Association (GD LCPE), joined by International Emission Trading Association (IETA), successively invited foreign low-carbon technology suppliers, emission reduction consulting firms, and allowance buyers to attend the exchange meetings with their partners in Guangdong. At the corporate level, several multinational enterprises, e.g., British Petroleum (BP) and London Office of China National Petroleum Corporation (CNPC), decided to join in Guangdong ETS, which has aroused the interest of the Chinese companies to devote themselves into the carbon market; KPMG and VERC0 have made massive work in bringing forth carbon asset management strategy and enhancing low-carbon competitiveness of companies.

- (3) Defining a scope of coverage in a scientific manner, and coordinating the relation between the cost and effect of emission reduction.

ETS construction involves seven components, i.e., the scope of coverage, targets for total emissions, allowance allocation rules, trading management, relevant laws,

MRV regulations, and links with other carbon markets. Among them, the scope of coverage is the fundamental component, since it determines the variety and quantity of covered enterprises and the total trading volume and allowance allocation approach, which will ultimately affect the ETS operational efficiency.

Guangdong ETS design group, in reference to the characteristics and requirements of carbon trading, and taking account of Guangdong carbon emission structure, economic plan, emission reduction targets, potentials for emission, cost for emission reduction, and data availability, built a “Selection and Assessment Model for Industrial Sectors” to define and assess the key industrial sectors to join in the ETS. Through calculation with this model, four industrial sectors of Guangdong were finally selected, i.e., electricity, cement, petrochemicals, and steel. In these sectors, there are 198 covered enterprises with annual carbon emissions exceeding 20,000 tons. These companies have large emissions, low-carbon leakage, accessible data, simple technologies (favorable for allowance allocation and verification), and great potentials for emission reduction. Their combined emissions account for around 50% of Guangdong’s total emissions, indicating that their involvement in the ETS will help Guangdong fulfill its targets for emission reduction during the “12th Five-Year-Plan” Period. Moreover, thanks to less variety and quantity of covered enterprises, and lower expenses on technology and management, Guangdong ETS shows more advantages in operation efficiency, management, and technology costs than other pilot areas.

- (4) Initiating a total allowance management system under the prerequisite for lowering carbon intensity, and exercising separate carbon budget management and accounting for old and new covered enterprises, which have resulted in remarkable emission reduction.

In light of China’s overall GHG emission targets, Guangdong’s development plan for key industries and target for controlling total energy consumption, Guangdong has conscientiously carried out the “cap-and-trade” mechanism by transforming the target for lowering carbon intensity into the upper limit of allowances, indicating that it has adopted the common systems in global carbon markets, and has the technical strength to link with other markets.

Guangdong is now at the stage of economic transition, so it is obliged to optimize the existing industrial sectors, foster growth of new productivity, and stabilize socioeconomic development. Based on the “cap-and-trade” mechanism, Guangdong initiated the separate emission accounting system for both old and new covered enterprises, established the basic principles for lowering the emissions of old companies, and strictly controlling the emissions of new companies, so as to ensure orderly management of provincial carbon emissions while sustaining economic growth.

Based on the “cap-and-trade” mechanism, the covered enterprises—holding about 60% of Guangdong’s total emissions—have achieved significant results in cutting emissions by means of technical transformation and building internal energy management system. In 2013, the old covered enterprises in electric and

petrochemical sectors lowered absolute emissions, i.e., their emissions fell 5–7% from 2012. All covered enterprises saw their emissions of per unit production drop by 2–10%, marking a great contribution in fulfilling Guangdong's target for lowering carbon intensity.

- (5) Lowering social cost for emission reduction and helping Guangdong transit to a low-carbon economy.

A multi-tier carbon market system has initially taken shape in Guangdong. It covers an allowance trading market and a verified VER market that both serve productive enterprises, a Carbon Inclusive System that benefits residents, as well as a linking mechanism between markets. Under such a multi-tier framework, covered enterprises are able to purchase allowances or a certain proportion of verified VER volume to offset their emissions, which helps covered enterprises lower cost for cutting emissions, and stimulates noncompliance companies to join in emission reduction. Under the Carbon Inclusive System, the individuals that have extravagant carbon consumption shall bear some cost for environmental governance, while those that insist on green consumption and environmental protection will be rewarded.

In retrospect to the years' socioeconomic developments of Guangdong, GIEC built a CGE Model that reflects the dynamic characteristics of the industrial structure and energy consumption structure of 33 sectors. They used this model to simulate Guangdong energy consumption and carbon emissions by 2020, and quantitatively assess the implications of ETS on the provincial socio-economy, cost of emission reduction, carbon price, and employment, and has come to the following conclusions: First, ETS is able to cut Guangdong total CO₂ emissions. By 2020, Guangdong emissions are predicted to reach 690 Mt, lower by 30–60 Mt than base scenario; it will be enough to fulfill the target for lowering carbon intensity by 45% at that time, as long as GDP growth remains at 7.5% (per capita GDP and carbon emissions in 2020 will increase four times and two times, respectively, from 2005). Second, owing to the cap on total emissions and the emission constraints on industrial sectors, Guangdong GDP growth may drop 1.23–1.58% by 2020. However, if the four sectors could join in the ETS, the lower cost for emission reduction will mitigate the GDP loss by 0.10%, i.e., to save the economic loss of 9 billion yuan, which will, in turn, greatly improve social welfare system. Third, the cap on emissions somewhat impacts the employment in the energy-intensive sectors, but creates new job opportunities on the whole, especially in the tertiary industry. The government shall, by means of increasing vocational education and training, help divert the labor force into the tertiary industry and service sector, which will mitigate the adverse impact on manufacturing and social stability.

The analysis of the macroeconomic implications of ETS with the CGE Model is from the perspective of the balanced economic system, and on account of the assumptions of full market competition, equilibrium carbon price based on market transparency, and full exploitation of reduction potentials. However, these

assumptions may somewhat vary from the actual situations in Guangdong carbon market, indicating that the simulation results will have some ambiguities.

- (6) Playing a significant role in expediting the elimination of backward production capacity and promoting industry transition and upgrading.

In addition to achieving cost-effective emission reduction, ETS shall be able to promote and guide the fulfillment of socioeconomic targets. This flexible carbon trading mechanism shall integrate industry transition and upgrading with emission reduction, in an aim to gradually raise Guangdong's energy-use efficiency, lower its total emissions, and upgrade its industrial structure and energy consumption structure. Guangdong ETS adopts different allowance allocation approaches for different industries. A set of strict allocation criteria encourages the companies with high emissions of per unit production to turn to high-tech and low-emission technologies and energy-saving equipment. As for the enterprises that are blacklisted by national and provincial departments for their outdated capacity, they have been pacing up the voluntary elimination of backward capacity or industry transferring driven by the ETS constraints and profits from allowance trading, which will quicken the readjustment of Guangdong industrial layout, and balance regional economic development.

- (7) Bolstering the development of low-carbon service sector and increasing job opportunities in this regard, greatly enhancing the ability and awareness of companies for controlling emissions.

After the ETS was launched, Guangdong has seen increasing demand for carbon-related organizational management, operational maintenance, third-party service, trading finance and publicity, which has given rise to a low-carbon service sector constituted by emission consulting firms, carbon asset management institutions, and exchange intermediaries. In 2013, Guangdong established 16 institutions for carbon emission verification, which hire almost 100 inspectors. If the consulting and service staff members in low-carbon service sector were counted in, then Guangdong ETS has directly created about 20,000 jobs. Besides, an analysis based on CGE Model shows that Guangdong carbon market will increase additional 40,000–50,000 jobs by 2020. Along with the continuous development of ETS, carbon trading will play a more significant role in industry transition and job creation.

Upon launching the ETS, how to use emission allowances efficiently has become one of the factors that affect corporate decision-making. Currently, the companies that have poured funds for technical upgrading and transformation are incorporating the profit from emission reduction into their return on investment (ROI). Several Chinese major groups, e.g., Guangdong Yudean Group and China Resources Power Holdings Co., Ltd. (“CR Power”), attach great attention to carbon budget and emission management, and they have come up with the group-wide carbon asset management rules.

- (8) Guangdong ETS is receiving attention from domestic and overseas carbon markets.

Guangdong carbon market features large capacity, extensive coverage, and diverse allocation patterns. It is the first one to create an allowance auction in China. Such characteristics have made Guangdong one of the most influential carbon markets both home and abroad. The international media have been closely watching the Guangdong carbon market. Reuters complimented Guangdong competent departments as “brave in transition and daring to be the first” for its boldness in borrowing experiences from mature carbon markets, initiating allowance auction in China, motivating companies to pay for emission allowances, and adding new companies into allowance management (their operation relies on allocation purchase). Guangdong carbon market has risen to the world’s second largest emission allowance market. In addition, Point Carbon spoke highly of Guangdong ETS for its transparency and data publicity, believing that it is a correct step toward building an open, just, and fair carbon market. IETA also expressed interest in Guangdong carbon market, it co-sponsored two seminars in Guangdong with GD LCPA, in an aim to encourage companies to learn from mature carbon markets in carbon asset management, and help Guangdong-based covered enterprises to actively deal with carbon trading.

In addition, the EU Commission, the UK Parliament and California Air Resources Board (CARB) also maintain regular policy exchanges and dialogue with Guangdong to discuss on the possibility of cooperation. The US Energy Foundation (EF), the UK Global Opportunities Fund (GOF) and other international funds show expectation for Guangdong carbon market; they have covered Guangdong ETS into one of their key funding projects to support Guangdong research institutions and their global counterparts to work together in frontier research about carbon trading.