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REPORT ON CHINA CARBON PRICING MECHANISM

Abstract

On September 22, 2020, Chinese President Xi Jinping announced in his speech at the general debate of the 75th session of the United Nations General Assembly that "China will scale up its Nationally Determined Contributions (NDC) by imposing more practical policies and measures. We aim to achieve carbon peak before 2030 and carbon neutrality before 2060 ("2030 & 2060" goals)." It is China's commitment to the international community, showing that China is accelerating on devoting efforts on addressing climate change.

China national emission trading system (ETS) first online trading was officially launched on July 16, 2021. Power generation sector is the first to be covered, including 2,162 key emission entities and about 4.5 billion tonnes of CO_2 emissions, making it the largest carbon market in the world.

ETS is a crucial tool for China to achieve the "2030 & 2060" goals. Carbon price is the core of carbon markets. Effective price signals can guide the resources allocation, incentivize the low carbon transition of enterprises, and reduce the cost of emission reduction for the whole society. A rational carbon pricing mechanism and the effective price transmission are crucial to the operation of China's national ETS. This report analyzes the pricing mechanism of China's pilot carbon markets and potential factors influencing the carbon pricing, and makes recommendations for pricing mechanism optimization of the national carbon market based on lessons learnt from international practice.

Contents

Introduction

ETS is a market-based policy instrument to control greenhouse gas emissions. In order to implement the national climate change policies and achieve the emission control goals, governments set the cap of total carbon emissions for a certain period of time (a compliance cycle) and allocate emission allowances to key emitters, which can be traded in the secondary market. Hence, market prices (carbon prices) are formed through the "Cap and Trade" pricing mechanism.

Served as a market signal, carbon prices guide and encourage enterprises on energy conservation and emission reduction. Key emitters are obligated to surrender an amount of allowances equivalent to their actual carbon emissions in each compliance period. Enterprises can either choose to reduce emissions by energy savings and other methods. Enterprises that manage to reduce their actual carbon emissions below the annual allocated allowances are able to sell the surplus on the carbon market for financial incentives. Meanwhile, those who emit more than allocated will need to purchase extra allowances or other eligible carbon credits for compliance. By releasing market price signals, the ETS incentivizes enterprises to conserve energy, reduce emissions, and optimize emission resource allocation, aiming at effectively lower the cost for achieving the emission reduction goals.

Whether carbon prices can facilitate emission reduction effectively is affected by various factors, including national climate targets and policies, and the design of the ETS. Countries usually set clear emission reduction targets to make sure that market expectations and carbon prices are stable. The European Green Deal has set a more ambitious goal of reducing GHG emissions by at least 55% by 2030, compared to 1990 levels (previously 40%), which has also directly contributed to the continued high carbon price in the EU ETS.

New Zealand aims to reduce emissions 30% below 2005 levels by 2030 and to reduce net emissions of all greenhouse gases (except biogenic methane[1]) to zero by 2050.

There are some international ETSs which have encountered issues including high price fluctuations and continued excessively low carbon prices at the initial stage of operation. To maintain market stability, most ETSs have adopted price or supply adjustment mechanisms (PSAMs). These mechanisms help jurisdictions build effective carbon markets by providing a degree of certainty regarding emissions prices[2]. EU ETS started the Market Stability Reserve（MSR） in 2019, which works by automatically moving allowances to the MSR whenever there are excess allowances in the market and releasing allowances from the MSR when there are shortage， playing a key role in reducing the surplus in the market. In Korea ETS, the stabilization measures include additional auctioning of allowances from the reserve （up to 25%)； establishment of a limit to the number of allowances in an entity's account（minimum 70% or maximum 150% of the allowance of the compliance year)；an increase or decrease of the borrowing limit; an increase or decrease of the offsets limit and temporary setup of a price ceiling or price floor.

China embraces the institutional innovation of using market-based mechanisms to facilitate GHG emission reduction and green low-carbon development. China's national ETS has become one of the major tools to realize its carbon peak and neutrality goals. To ensure the effective function of price signals, a market-based carbon pricing mechanism determined by supply and demand is essential. China's national ETS should followed the principles mentioned above, keep optimizing pricing mechanism, and facilitate the decisive function of ETS in resource allocation.”

[1] Reduce biogenic methane emissions 10% below 2017 levels by 2030, and 24-47% by 2050. (Climate Change Response (Zero Carbon) Amendment Act 2019)

[2] The world bank. State and trends of carbon pricing 2021.

Carbon Pricing in China Pilot Carbon Markets

In October 2011, the National Development and Reform Commission (NDRC) approved the ETS pilots in seven provinces and cities, including Beijing, Tianjin, Shanghai, Chongqing, Hubei, Guangdong and Shenzhen, which successively started trading in 2013 and 2014. Following the seven pilots, two local ETSs in Sichuan[3] and Fujian provinces were also launched in December 2016. A "7+2" pattern for regional carbon markets was thus created.

Table 2-1 Development of China's pilots[4]

Shanghai	
Cap	105 $MtCO_2$ (2020)
Allocation	Free Allocation (Grandparenting; Benchmarking) and Auctioning.
Offsets	China GHG Voluntary Emission Reduction Program (China Certified Emission Reductions—CCERs—are allowed, with quantitative and qualitative limits.
MRV	Annual reporting of CO_2 emissions. Third-party verification is required, and further validation is carried out by government-assigned experts to further enhance the accuracy The government also assesses the performance of the verifiers through a performance evaluation mechanism.
Average secondary market price(2021)	CNY 40.16 (USD 6.23)

[3] There is no allowance trading in the Sichuan pilot, which only trades Chinese Certified Emission Reduction (CCER).

[4] ICAP, Emissions Trading Worldwide Status Report 2022.

Beijing	
Cap	35 $MtCO_2$ (2021)
Allocation	Free allocation (Grandparenting; Benchmarking)
Offsets	CCERs are allowed. In addition, Beijing also has introduced a local offset program focusing on carbon sinks, low-carbon transport, and energy saving, with quantitative and qualitative limits.
MRV	Annual reporting of CO_2 emissions. Third-party verification is required, and the government organizes expert review of all the verification reports.
Average secondary market price(2021)	CNY 61.13 (USD 9.48)
Guangdong	
Cap	265 $MtCO_2$ (2021)
Allocation	Free Allocation (Grandparenting; Benchmarking) and Auctioning.
Offsets	CCERs and Tan Pu Hui Certified Emission Reduction (PHCER), a local offset program introduced in the Guangdong pilot in 2017, are allowed, with quantitative and qualitative limits.
MRV	Annual reporting of CO_2 emissions. Third-party verification is required. The"technical evaluation organizations" selected by the government carry out technical review and evaluation of the annual emissions reports and verification reports and undertake further onsite review and random inspection tasks.
Average secondary market price(2021)	CNY 38.13 (USD 5.91)

Shenzhen	
Cap	22 $MtCO_2$ (2020)
Allocation	Free allocation (Grandparenting; Benchmarking)
Offsets	CCERs are allowed, with quantitative and qualitative limits.
MRV	Annual reporting of CO_2 emissions. Third-party verification is required and the government conducts further random checks of emission reports and verification reports.
Average secondary market price(2021)	CNY 11.23 (USD 1.74)
Hubei	
Cap	166 $MtCO_2$ (2020)
Allocation	Free Allocation (Grandparenting; Benchmarking) and Auctioning.
Offsets	CCERs are allowed, with quantitative and qualitative limits.
MRV	Annual reporting of CO_2 emissions. Third-party verification is required and further validation is carried out by government-assigned experts to further enhance the accuracy.
Average secondary market price(2021)	CNY 34.28 (USD 5.32)

Tianjin	
Cap	120 $MtCO_2$ (2020)
Allocation	Free Allocation (Grandparenting; Benchmarking) and Auctioning.
Offsets	CCERs are allowed as well as Tianjin regional forestry offsets, with quantitative and qualitative limits.
MRV	Annual reporting of CO_2 emissions. Third-party verification is required.
Average secondary market price(2021)	CNY 30.53 (USD 4.73)
Chongqing	
Cap	78.39 $MtCO_2e$ (2020)
Allocation	Free Allocation (Grandparenting) and Auctioning.
Offsets	CCERs are allowed and since September 2021, a local carbon offset program has been also operationalized which generates CQCER credits for both compliance and voluntary use, with quantitative and qualitative limits.
MRV	Annual reporting of GHG emissions. Third-party verification is required.
Average secondary market price(2021)	CNY 26.53 (USD 4.11)
Fujian	
Cap	~126 $MtCO_2$ (2020)
Allocation	Free Allocation (Grandparenting; Benchmarking) and Auctioning.
Offsets	CCERs and Fujian Forestry Certified Emission Reduction credits (FFCERs) are allowed, with quantitative and qualitative limits.
MRV	Annual reporting of CO_2 emissions. Third-party verification is required for all the annual emissions reports and further validation is carried out by government-assigned experts for ~30% of the reports to further enhance accuracy.
Average secondary market price(2021)	CNY 16.75 (USD 2.6)

ETS is a policy instrument for managing and reducing emission at the lowest cost, and the pricing mechanism is one of its core elements. Despite problems such as low liquidity, the pilots have established price mechanisms compatible with its development after years of practice. Factors such as cap setting, allowance allocation methods, application of offsetting mechanisms, trading modes, market openness and market adjustment all affect carbon pricing to different extents, which can be divided into macro and micro, long-term and short-term factors.

2.1 Cap setting

Emission cap, which indicates the supply in the market, is the prerequisite and foundation for ETS. The cap should be set within a appropriate range. When the emission targets get more ambitious, the total supply of allowances will be reduced, and carbon price is expected to rise with other conditions unchanged.

It can be seen from the operation of the pilots that different caps have been set based on the respective economic development and carbon emission conditions. Yet most of the pilots have experienced low annual trading volume as share of the total supply of allowances, which showing low market liquidity and it is not conducive for price discovery. Taking 2020 as an example, the Hubei pilot had the highest annual transaction ratio of 10.75%, while the figures of the other pilots were relatively low. For Fujian, it was only 0.79%, for instance.

Table 2-2 Caps and annual transactions in 2020 of China's pilots

Pilots	Cap(Mt)	Annual transactions(Mt)	Ratio(%)
Shanghai	105	3.79	3.61
Beijing	50	5.32	10.64
Guangdong	465	33.03	7.10
Shenzhen	22	1.35	6.14
Hubei	166	17.84	10.75
Tianjin	120	11.06	9.22
Chongqing	78.39	1.92	2.45
Fujian	126	0.99	0.79

2.2 Auction

Auction contributes to carbon price discovery in three ways. **First, auction can guide the market in price anchoring,** especially at the early stage of the carbon market, when there are large differences in the predictions of the participants on the price of allowances. **Second, it helps discover prices** that are acceptable for most participants when the price fluctuation is relatively volatile. **Third, it can suppress the excessively high price** by increasing the market supply through auctioning. The followings are analysis of auctions in Shanghai and Guangdong pilots.

(1)*Auction in Shanghai pilot*

As of August 20, 2021, seven market-based auctions have been organized by the Shanghai pilot, including 5 compliance auctions (only for covered entities) and 2 non-compliance auctions (for both covered entities and institutional investors).

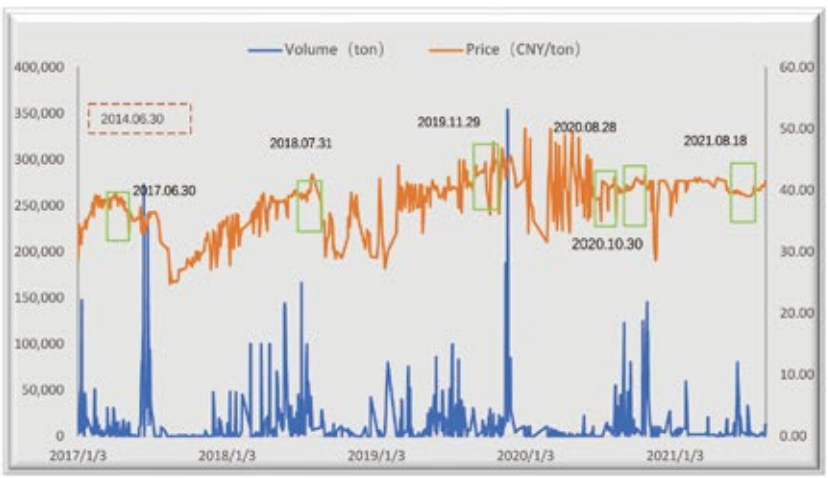

Figure 2-1 Seven auctions in Shanghai pilot

Compliance Auction

The auction for compliance purpose in Shanghai pilot was exclusive for the covered entities and was only conducted one day before the compliance deadline. The reserve price is usually set at 1.1 to 1.2 times of the weighted historical average price, which actually incentives enterprises to fulfill their compliance obligations by purchasing allowances or credits on the secondary market as early as possible, thus strengthening market expectations and pushing up price with increased demands at the same time.

A trend of increasing trading volume and rising price can be seen during the auction period. The *Announcement on the Issuance of Carbon Emission Allowances through Auctions of Shanghai* issued by the local authorities on June 12, 2017 had an obvious impact on the secondary market. The day after the policy was released, the volume of allowances traded in the Shanghai ETS reached a record high of 257,000 tonnes since its launching, and the intraday price once arrived at 36.42 CNY/tonne, approaching the daily limit, and then slowly declined and closed at 35.00 CNY/tonne, up 5.74% from the previous trading day.

Non-compliance Auction

The non-compliance auction held on August 28, 2020 was the first one **opened for both covered entities and institutional investors**, which were held three months before the deadline of the compliance date. The auction rules have also been optimized, making the auction a flexible market adjustment tool rather than just a compliance tool. This is an important step toward a more market-oriented system, allowing institutional investors to actively participate in the market.

On August 18, 2021, Shanghai pilot held another non-compliance auction. Both covered entities and institutional investors were allowed to participate in the auction, and the reserve price is the weighted average market price of all trading days between April 1, 2021 and July 31, 2021.

The reserve price of two non-compliance auctions remained consistent with the weighted historical average price, and purchase ceilings were set for both enterprises and institutional investors. **In this way the auction mechanism can effectively play its role of market adjustment,** which to a certain extent alleviated the pressure of allowance shortage without significantly affecting the price.

(2) *Auction in Guangdong pilot*

Guangdong pilot has accumulated rich experience in the allowance auction, and the first auction of 3 million tonnes of allowances was organized as early as December 16, 2013 at the very beginning of the market's operation. The followings are main characteristics of the auction in Guangdong pilot:

▶ **Participants:** The auction was only opened to covered entities in the first year. Since the second year, institutional investors have been also allowed to participate, which enhanced market liquidity.

▶ **Mandatory participation of covered entities:** In the first year, it was mandatory for all covered entities to participate in the auction. Only with the purchase of 3% allowances through auction by the covered entity, the rest of 97% free allowances can be activated. Since the second year, only new entrants were required to participate in auctions to activate the free allowances, and other covered entities can participate voluntarily on the basis of the free allocation (95% for enterprises in the power sector and 97% for other sectors).

▶ **Auction mechanism:** The principle of "price-time priority" is adopted, and one unified bid-winning price is generated as a price signal to the market. In addition, a fixed reserve price is set for price anchoring in the secondary market.

Figure 2-2 Auction prices and closing prices in Guangdong pilot

From the auction prices and closing prices in the secondary market in Guangdong pilot over the years, the impact of auction on the market has gone through the following stages:

▶ **Auction Floor Price Anchors Carbon Price in the Secondary Market.** The auction floor price was set at 60 CNY/tonne in 2013, as a result of which the carbon prices in the secondary market basically maintained above the floor price. The auction floor price does serve as an anchor for the secondary market. However, the actual trading volume and market liquidity were relatively low, partly because the participants were not yet familiar with the system when the market had just been started. On the other hand, most participants were not enthusiastic about bidding at this high price level. Later, the secondary market prices were all lower than 60 CNY/tonne, which also showed that the fixed auction floor price at that time was high.

▶ **The Function of Auction Floor Price Did Not Work as Originally Expected.** In 2014, as many participants realized that the overall market supply exceeded the demand, carbon price started to fall sharply. Although a fixed auction floor price was still set with the hope to anchor the pricing. However, judging from the development in the secondary market, the floor price failed to function as originally expected.

▶ **Auction Played a Role in Adjusting Market Supply and Demand.** In 2015-2017, the floor price was changed from a fixed price to a floating price, and was linked to the price in the secondary market. In effect, the market prices also matched the auction prices at the corresponding time. Auction was no longer intended to play the role in price anchoring in those years, but to help adjust the market supply and demand.

▶ **The auction policy of Guangdong pilot gradually stabilized in the following years.** In April 2020, one auction took place with a floor price of 25.84 CNY/tonne, selling 400,000 allowances at the price of 28.20 CNY/tonne, which was consistent with the secondary market price.

2.3 Offset Mechanism

The offset mechanism is introduced to firstly reduce the compliance cost of covered entities; secondly to subsidize projects that can generate emission reductions through market means; thirdly, increase the number of participants and enrich the trading varieties in the ETS to further increase market liquidity.

As a market-based incentive, offset mechanism provides a flexible way for compliance. The offset ratio, ranging from 3% to 10% in the pilots, can be adjusted to affect the price by changing the supply and demand. The more supply of carbon credits for offset, the lower the carbon price, with other conditions unchanged. In Shanghai pilot, the CCER offset ratio was reduced from 5% to 1% in 2016, and then raised to 3% in 2019. **The adjustment has become one of the effective ways to avoid abnormal fluctuations in allowance prices by adjusting supply and demand.**

To avoid oversupply, the pilots have further imposed strict restrictions on project type, location and time of emission reductions eligible for offsetting on top of the requirement on the allowed ratio of offsets.

Table 2-3 Offset mechanism of China's pilots

Shanghai	
Quantitative Limit	3%
Qualitative Limit	Credits from hydro projects are not allowed.
	Only 2 % was allowed for credits generated outside the Yangtze River Delta region and 1 % must be from within the region.
	Credits for reductions that were realized before January 2013 cannot be used for compliance.
Beijing	
Quantitative Limit	5%
Qualitative Limit	Credits from hydropower, HFCs, PFCs, N_2O, and SF_6 projects are not eligible.
	Of the 5 % limit, at least 50 % must come from projects within the jurisdiction of the city of Beijing. Among non-Beijing CCERs, priority is given to those with regional climate or pollution control cooperation agreements (e.g., Hebei and Tianjin).
	CCERs must come from projects that began operations from 2013 onwards (with exceptions for carbon sink projects, for which the date is February 2005).
Guangdong	
Quantitative Limit	10%
Qualitative Limit	Pre-CDM credits are not eligible. Credits from hydro and from most fossil fuel projects are also not eligible. To be eligible, projects must relate primarily (i.e., more than 50 %) to the reduction of CO_2 and CH_4 emissions.
	At least 70 % of offsets used by each regulated entity must come from within Guangdong province.

Shenzhen	
Quantitative Limit	10%
Qualitative Limit	Credits from wind power, photovoltaic, waste-to-energy, rural household biogas and biomass power generation projects; clean transportation emission reduction projects; marine carbon sequestration emission reduction projects; forestry carbon sink projects; agricultural emission reduction projects.
	Wind power, photovoltaic, waste-to-energy projects from Guangdong (designated areas), Xinjiang, Tibet, Qinghai, Ningxia, Inner Mongolia, Gansu, Shaanxi, Anhui, Jiangxi, Hunan, Sichuan, Guizhou, Guangxi, Yunnan, Fujian, and Hainan provinces; nationwide forestry carbon sink projects and agricultural emission reduction projects; the rest of the projects shall be located in Shenzhen and the provinces and regions that have signed regional strategic cooperation agreements on carbon trading with Shenzhen.
Hubei	
Quantitative Limit	10%
Qualitative Limit	CCERs must be generated within Hubei, but outside the covered entities of Hubei ETS.
	CCERs must come from rural biogas or forestry projects in the key counties under the national or provincial poverty alleviation plan in areas of the middle reaches of the Yangtze River (within Hubei).
	CCERs must have been generated between 2013–2015.

Tianjin	
Quantitative Limit	10%
Qualitative Limit	Credits must stem from CO_2 reduction projects, excluding hydro-electric power plants.
	CCERs from projects in Beijing, Tianjin and Hebei are prioritized.
	The emissions reductions must have occurred after 2013.
Chongqing	
Quantitative Limit	8%
Qualitative Limit	Credits from hydro projects are not allowed.
	Reductions must be achieved after 2010 with the exception of carbon sink projects.
Fujian	
Quantitative Limit	10%
Qualitative Limit	Credits from CO_2 or CH_4 projects. Hydropower-related credits are not eligible.
	Eligible offsets are restricted to those generated in Fujian province from entities not regulated under the ETS.
	FFCER projects are eligible if implementation took place after mid-February 2005 and if the project developers have independent legal personality.

2.4 Trading Mode

The trading modes adopted in the pilots are mainly online trading and agreement transfer, resulting in different prices. The price of online trading is determined by the market, which is more in line with market-oriented pricing mechanism rules, while the price of agreement transfer is determined by the point-to-point negotiation mechanism, changing with a wide range, which makes the trading mode suitable for block trading. In order to prevent drastic fluctuations in carbon prices, the pilots usually set the daily price fluctuation limits to directly regulate the prices, generally a range between 10% to 30%.

Table 2-4 Trading modes and daily price fluctuation limits of China's pilots

Pilots	Trading Modes and Daily Price Fluctuation Limits
Shanghai	Online trading(10%); Agreement transfer(30%)
Beijing	Online trading(20%); Agreement transfer
Guangdong	Online selection transaction(10%); Agreement transfer(30%)
Shenzhen	Online bidding; Fixed price selection(10%); Block trading(30%)
Hubei	Agreement transfer(10%); Fixed price transfer(30%)
Tianjin	Auctions; Agreement transfer(10%)
Chongqing	Fixed price trading(10%); Agreement transfer(30%)
Fujian	Online selection transaction(10%), Agreement transfer(30%); One-way bidding; Fixed price transfer

In terms of the price difference between auctions and transfer agreements, it varies from pilot to pilot due to the differences in market openness and pricing models of the two trading modes. For example, the transfer agreement prices in Shanghai, Hubei and Tianjin ETS were close to the auction prices and relatively stable, while in Beijing the transfer agreement prices were usually much lower than the auction prices and more volatile. Some pilots did not publish information on transfer agreement prices.

2.5 Market Openness

Experience in the pilots show that the diversification of market players has improved the liquidity of the regional carbon markets. Since the introduction of institutional investors to the Shanghai ETS in September 2014, the trading volume in the secondary market has increased and market liquidity enhanced. As can be seen in the following charts, in the compliance years from 2013 to 2019, institutional investors accounted for almost half of the trading except for 2013.

Figure 2-3 Number of covered entites and institutional investors in Shanghai pilot

Figure 2-4 Trading Proportions of covered entities and institutional investors in Shanghai pilot

The participation and increasing number of investment institutions indicates enhanced market openness. The diversification and the increased number of participants will provide sufficient counterparties, thus raising trading activities in the carbon market and facilitating price discovery. In addition, institutional investors can provide professional carbon asset management for enterprises, diversify the risk of price fluctuations, and enhance pricing efficiency.

2.6 Market Stability

To ensure the stability of the ETS, the pilot regions have, to varying degrees, adopted market regulation measures, including government-reserved allowances for adjustment. The provisions are, however, general in nature and without specific conditions and measures for implementation, which need to be further improved.

Table 2-5 Market stability provisions of China's pilots

Pilots	Market stability provisions	Sources
Shanghai	Municipal Development & Reform Commission and other competent authorities took relevant regulatory measures to maintain the stability of the ETS. The total annual allowances include directly issued allowances and reserve allowances.	*Shanghai Carbon Emission Management Measures (Trial)* (Hu Fu Ling No. 10), *Shanghai Carbon Emission Allowance Allocation Plan for 2020* (Hu Huan Qi [2021] No. 22)
Beijing	No more than 5% of the total annual allowances is reserved as the adjustment for the key emission entities and the market. In case of abnormal price fluctuations, methods including auctions and repurchase are adopted to stabilize the price and maintain order in the market.	*Measures for the Management of Carbon Emission Trading of Beijing (Trial)* (Jing Zheng Fa [2014] No. 14), *Notice of the Beijing Municipal Development and Reform Commission on the Pilot of Carbon Emission Trading* (Jing Fa Gai Gui [2013] No. 5)
Guangdong	5 % of allowances are set aside for government reserves for new entrants and market stability.	*Guangdong Carbon Emission Management Measures (Trial)* (Yue Fu Ling [2020]No. 275)

Pilots	Market stability provisions	Sources
Shenzhen	The competent authority keeps 2% of the total annual allowances as reserve, and the repurchase of allowances by the competent authority shall not exceed 10% of the effective allowances in circulation in the current year.	*Interim Measures for the Management of Carbon Emission Trading of Shenzhen* (Order of Shenzhen Municipal People's Government No. 262)
Hubei	The total allowances include those issued to covered entities, government reserved allowances, and allowances for new projects and enterprises. 8 % of the total cap is kept as a government reserve for market stabilization.	*Hubei Allocation Plan of Carbon Emission Trading (2020)*
Tianjin	In the event of large price fluctuations in the trading market, the price should be stabilized by means of auction or selling allowances at a fixed price.	*Interim Measures for the Management of Carbon Emission Trading of Tianjin* (Jin Zheng Ban Fa [2018] No. 12)
Chongqing	The amount for sale of the covered entity shall not exceed 50% of its annual total allocated allowances, while the allowances obtained through trading and banked allowances are not subject to this limit.	*Interim Measures for the Management of Carbon Emission Trading of Chongqing* (Yu Fu Fa [2014] No. 17)
Fujian	The provincial government authority sets aside a certain amount of allowances at the provincial level for market regulation, modification and expansion of major projects.	*Interim Measures for the Management of Carbon Emission Trading of Fujian Province* (Order of Provincial Government No. 176)

State of China's national ETS

> In December 2017, the National Development and Reform Commission[5] issued the *Work Plan for Construction of the National Emissions Trading System (Power Sector)*, which marks the official kickoff of the construction of the national ETS. After the three stages of initial preparation, improvement and test run, the national ETS officially started online trading on July 16, 2021.

[5] From the institutional perspective, the National Development and Reform Commission (NDRC) was responsible for national ETS development until 2018. That year, as part of a broader government restructuring, the climate change policy portfolio (including the development of the ETS) was shifted to the newly established Chinese Ministry of Ecology and Environment (MEE).

3.1 Policy Framework

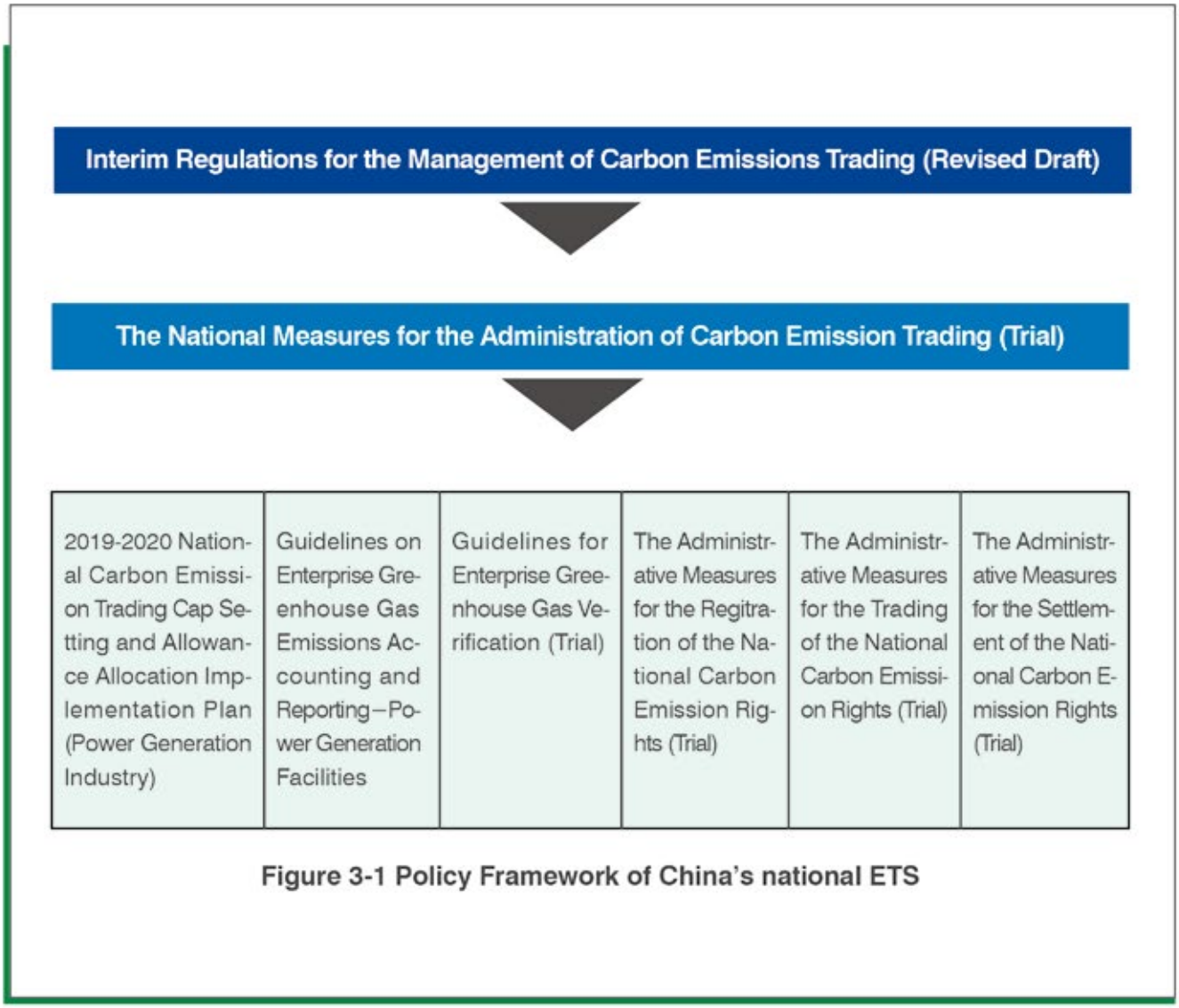

Figure 3-1 Policy Framework of China's national ETS

■ Laws and Regulations

In March 2021, the Ministry of Ecology and Environment (MEE) published the *Interim Regulations for the Management of Carbon Emissions Trading (Revised Draft)* (hereinafter referred to as the Interim Regulations) for public consultation. This sets the legal framework for the management of the national ETS, and has been included in the State Council's legislative plan for 2021.

■ Departmental Regulations

The National Measures for the Administration of Carbon Emission Trading (Trial) (MEE Decree No. 19) (hereinafter referred to as the Measures) issued by MEE came into force on February 1, 2021. The main points include:

Enhanced responsibility of entities. The key emission entities shall be responsible for the authenticity, completeness and accuracy of their emission reports, and the ecology and environment authorities shall verify and supervise the quality of their monitoring plans and emission reports.

Clear division of responsibilities of ecology and environment authorities at all levels. The MEE is responsible for formulating regulations, standards and technical specifications for the national ETS, and supervising the trading and other related activities. Provincial ecology and environment authorities are responsible for the supervision and administration of the reporting and verification, allowance allocation, allowance surrender and compliance, etc. Municipal ecology and environment authorities are mainly responsible for the implementation following the instructions made by provincial authorities.

Strengthened supervision with information disclosure. Information disclosure on verification and monitoring as well as emission reports and allowance surrendering will be strengthened, so as the management process to ensure the authenticity of emission information.

■ Technical Guidelines

In December 2020, MEE released the *2019-2020 National Carbon Emission Trading Cap Setting and Allowance Allocation Implementation Plan (Power Generation Industry)* (hereinafter referred to as the Plan) and announced the list of covered entities. The Plan makes detailed provisions on cap setting, allocation methods, and allowance issuance and surrendering.

In March 2021, MEE issued the *Guidelines on Enterprises Greenhouse Gas Emissions Accounting and Reporting – Power Generation Facilities and Guidelines for Enterprises Greenhouse Gas Verification (Trial)* to further regulate the verification of GHG emissions reporting in the national ETS.

■ Normative Documents

In May 2021, MEE issued the *Administrative Measures for the Registration of the National Carbon Emission Rights (Trial), Administrative Measures for the Trading of the National Carbon Emission Rights (Trial), Administrative Measures for the Settlement of the National Carbon Emission Rights (Trial)* to provide detailed provisions on each of the issues.

3.2 Scope

At the initial stage, the national ETS focuses on the power sector (including captive power plants of other sectors), and the threshold is set at 26,000 tonnes CO_2e of annual GHG emissions (comprehensive energy consumption of about 10,000 tonnes of standard coal).

▶ 2,162 eligible key emission entities were first included, covering about 4.5 billion tonnes of carbon emissions.

▶ In the future, other key emission industries such as petrochemicals, chemicals, building materials, iron and steel, non-ferrous metals, paper making, and aviation will be gradually included during the 14th Five-Year Plan period based on the sectoral readiness in terms of allocation methods and emission data reporting and management. The principle is to cover an industry as long as the conditions mature.

3.3 Allowance Allocation

Free allocation of allowances is currently the primary allocation method for the national ETS, while paid allocation will be introduced at an appropriate time according to the national requirements. In the period of 2019 to 2020, all allowances were allocated free of charge. Benchmarking was adopted to calculate the allowances for the covered entities in the power sector. Different benchmarks were set for different types of generator units. The benchmark values are shown in Table 3-1.

Table 3-1 2019-2020 Benchmarks for different types of generator units

Type of Generator units	Coverage of types	Benchmark for power generation (t CO_2/MWh)	Benchmark for heat generation (t CO_2/GJ)
I	Conventional coal-fired units of > 300MW	0.877	0.126
II	Conventional coal-fired units of ≤ 300MW	0.979	0.126
III	Non-conventional coal-fired units including gangue and coal water slurry (including circulating fluidized bed units)	1.146	0.126
IV	Gas-fired units	0.392	0.059

3.4 Offset Mechanism

Covered entities in the national ETS can use offsets for up to 5% of the allowances to be surrendered from CCER every year. China also encourages the use of emission reduction projects including renewable energy, forestry carbon sinks, and methane utilization as offsets. The specific rules will be developed by MEE.

3.5 Trading System

■ Products

The trading product of the national ETS in its initial stage is spot allowance, and other products will be added in due course according to national regulations.

■ Participants

The participants of trading in the national ETS are the regulated emission entities, while the market will gradually open to eligible institutional and individual investors in the future.

■ Trading Modes

Carbon emission allowances (CEAs) are traded on the national carbon emission trading platform by methods of agreement transfer, single-way bidding or other permitted modes. Agreement transfer includes negotiated online trading and block trading.

Table 3-2 Trading modes in China's national ETS

Trading Modes		Requirements	Daily price fluctuation limit
Agreement transfer	Negotiated Online trading	A single transaction should be less than 100,000 tonnes of CO_2e. The participants can view real-time pending orders and complete transactions based on price precedence.	±10%
	Negotiated block trading	A single transaction should be no less than 100,000 tonnes of CO_2e. The participants quote, inquire prices and confirm transactions on the trading system.	±30%
Single-way bidding		The participants make applications to the trading platform for selling or purchasing, after which the Exchange issues the bidding announcements. Interested parties offer quotations in accordance with the rules and completes transactions on the trading platform.	N/A

3.6 MRV

The first compliance period of the national ETS covers the whole year of 2021, and the surrendering of allowances for compliance shall be completed by December 31. To obtain accurate data related to allowance allocation and compliance in the power sector, and to ensure data quality for the national ETS to expand its coverage of sectors and improve the allocation methods, MEE has strengthened the management of GHG emission reporting. Enterprises with GHG emissions of 26,000 tonnes of CO_2e or more in any year from 2013 to 2020 in key emission industries such as power, petrochemical, chemical, building materials, iron and steel, non-ferrous, paper, and aviation are obligated to report their carbon emissions.

2020 Annual GHG Emissions Report	Verification	Submission of lists of covered entities in the power sector and other information
Power sector: Online reporting shall be completed by Apr. 30, 2021 **Other sectors:** Online reporting shall be completed by Sep. 30, 2021	**Power sector:** Reporting of verified data shall be completed by Jun. 30, 2021 **Other sectors:**Reporting of verified data shall be completed by Dec. 31, 2021	**Submission of the list of covered entities** in the power sector shall be completed by Jun. 30, 2021 and shall be disclosed to the public. **Allowance approval** shall be completed by Sep. 30, 2021

Figure 3-2 MRV requirements of the first compliance period of the national ETS

3.7 Supervision

The national ETS has set up a multi-level supervision system, where the ecology and environment authorities at various levels supervise the trading and other activities of the national ETS based on the division of responsibilities. In addition, risk management mechanisms are established at the exchange level to monitor trading behaviors and control risks in real time.

Supervision by the Competent Authority

MEE: Developing unified rules, standards and technical specifications for the national ETS, supervise and guide trading and other related activities.

Provincial ecology and environment authorities: Lead the supervision and administration of GHG data reporting, verification, allowance allocation, allowance surrendering for compliance and other related activities in the national ETS.

Municipal ecology and environment authorities: Implement the instructions made by provincial authorities.

Risks Control by Exchanges

Price fluctuation limits, position limits, reporting of large accounts

warning, risk reserves, monitoring of abnormal trading

Figure 3-3 Supervision system of China's national ETS

3.8 Market Performance

The national ETS officially launched online trading on July 16, 2021. 4.1 million tonnes of CEAs were traded on the first day with a turnover of RMB 210 million. The closing price reached RMB 51.23 per tonne, up by 6.73% from the opening price. During the first week, the market expectations on carbon price were upward in general, and the price of allowances rose steadily, while the trading volume slightly shrank, ranging between 110,000 and 220,000 tonnes per day.

As of December 31, 2021, the first compliance period of the national ETS was successfully completed. It went generally smooth and orderly, the price fluctuations of allowances were within an appropriate range, and the trade volume was characterized by an obvious compliance-driven pattern.

Slight fluctuations of listed prices. The price continued to rise during the first week of the national ETS, reaching a maximum of 60 yuan per tonne, after which the price showed a downward trend and basically remained at around 42 yuan per tonne after late October. In mid-December, as the compliance deadline approached, carbon prices rose rapidly again, closing at 54.22 yuan per tonne on December 31, up by 13% from the opening price on the first operation day of July 16. The first compliance period of the national ETS spanned 114 trading days, with a cumulative trading volume of 179 million tonnes of carbon allowances and a cumulative turnover of RMB 7.661 billion. Observed from the volume of allowances which have been surrendered, the compliance completion rate was 99.5%. The highest listed price was 62.29 yuan per tonne on December 30, and the lowest 38.5 yuan per tonne on October 27. In addition, there was a high price of 61.07 yuan per tonne on July 23 at the beginning of the ETS operation. Apart from these three trading days, the auction price was stably maintained at 40 – 60 yuan per tonne.

A compliance-driven pattern shown by the trading volume. On the first day of the national ETS, the trading volume reached 4.1 million tonnes, and from the second trading day onwards, there was a significant downward trend, with the daily volume fluctuating between thousands and tens of thousands of tonnes. As the compliance deadline approached, the volume rose rapidly since late November. On December 16, the volume exceeded 20 million tonnes, setting a new high for single-day transaction. An obvious compliance-driven pattern in the trading volume can be seen, indicating that the current carbon trading strategies of most enterprises are relatively passive and they still trade mainly for compliance purposes.

Negotiated block trading as the dominating trading mode. The trading methods in the national ETS include online trading and block trading. The volume of block trading in the first compliance period reached 148 million tonnes, accounting for 82.8% of the total trading volume, while the online trading accounts for 17.2% of the total. The turnover of block trading reached 6.21 billion yuan, accounting for 81.1% of the total, while the online trading accounts for 18.9%. For the market price, the average price of block trading basically fluctuated between 40 – 50 yuan per tonne, which was slightly lower than the average price of online trading.

After the compliance period, the trading volume shrank significantly, and dropped to the level of hundreds of tonnes or even less than 100 tonnes since mid-January 2022. The overall listed price is relatively stable, basically remaining at around 58 yuan per tonne, with the price of block transfer agreements fluctuating around 55 yuan per tonne. As of March 31, 2022, the cumulative trading volume of the national ETS was 189 million tonnes, with a cumulative turnover of 8.208 billion yuan.

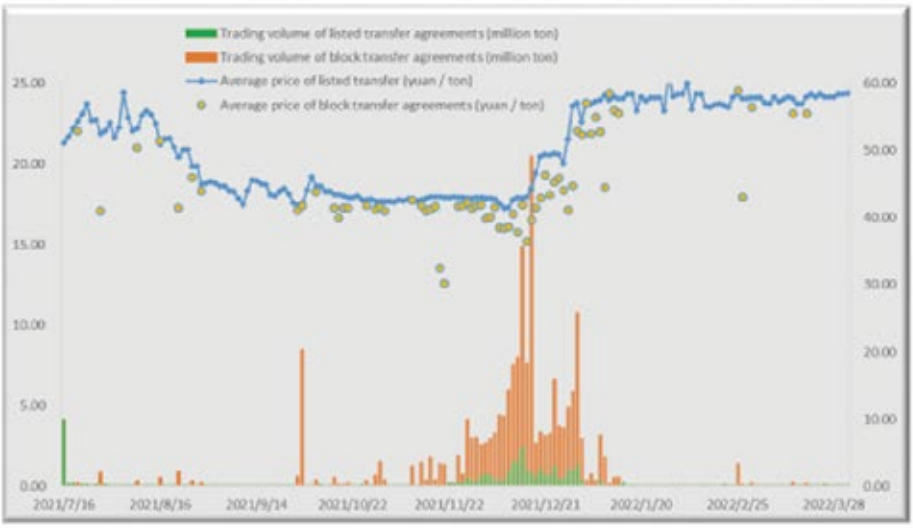

Figure 3-4 Trading volume and average price of the national ETS

Figure 3-5 Percentage of trading volume and turnover of listed transfer and block transfer agreements

Factors Influencing the Carbon Price in ETS

Rational and effective carbon prices are crucial to the operation of the carbon market. After the national ETS officially started operation, the price trend has become the focus of attention of all market participants. In its initial stage, the market only covers the power sector, mainly the central and local state-owned enterprises (SOEs), which are often managed within a big group. In addition, the enterprises expect that the allocation would be tightened in the future and are therefore reluctant to sell allowances or take a wait-and-see attitude towards carbon trading. These factors will directly affect trading activities in the national ETS, which will further impede the price discovery function of the market.

Carbon prices move essentially in response to changes in supply and demand in the market. In addition, factors such as predictability of policies, diversity of trading products, trading rules, requirements on information disclosure and internal decision-making of enterprises can all affect the formation of prices in the national ETS.

4.1 Demand Side

Factors including macroeconomic and energy structure affect the total demand. In boom years, if the supply remain unchanged, the production activities of enterprises keep expanding, therefore the demand for carbon emissions allowance rise accordingly and the price of allowances rises as well, and vice versa. Enterprises use different types of energy in their production, and their demand for carbon emissions allowances varies accordingly. For example, compared with enterprises using fossil fuels, those who use clean energy have a lower demand for allowances. With the government vigorously developing clean energy, the future adjustment of energy structure will affect the price of allowances by changing the total demand.

4.2 Supply Side

The overall ETS design, such as the cap, allocation methods and offset mechanisms determine the total allowance supply. At the initial stage of the national ETS, allowances are all allocated free, and benchmarking is used to calculate the allowances for the covered entities. The allocation determines the initial supply of allowances, and the supply will be reduced when the emission benchmarks are tightened, which will lead to changes in carbon prices when there is a gap between the supply and actual demand. Based on free allocation, the national ETS will introduce auction in due course and gradually increase its proportion. When there is a cost on the initial allowances, enterprises will be motivated to choose effective ways to save energy and reduce emission, while it will also help shape price expectations on the secondary market.

Another important factor influencing the supply is the offset mechanism. The offset ratio directly impacts the amount of the supply. From the practices in China and abroad, the price of carbon credits from the offset mechanisms is often lower than the price of allowances. Therefore, in ETSs that allow offsets,covered entities are inclined to buy carbon credits to offset their excess emissions. Although the offset mechanism can alleviate the compliance costs of enterprises, an excessively high offset ratio may induce market flooding that easily cause a fall of the allowance price. The offset ratio in the national ETS is set at up to 5% of the allowances to be surrendered, and the use of emission reductions from projects in renewable energy, forestry carbon sinks, methane utilization and others for offset is encouraged.

4.3 Policy Predictability

Carbon markets are highly policy-oriented, and carbon prices are easily influenced by government actions, such as changes in the tightness of the cap, the price setting of the auction, the validity period of allowances, and the offset ratio. All of these will have impacts on the prices on the secondary market. A clear and well-defined policy path can provide strong predictability for enterprises to make long-term strategies in energy saving and emission reduction, thus enhancing their willingness to participate in carbon trading.

Without policy consistency and continuity, there will be no stable market expectations and enterprises will tend to only engage passively in trading or even hold a wait-and-see attitude, leading to concentrated market activities before the compliance deadline. In this case, as the demand for allowances surges towards the end of the compliance deadline, allowance price will rise dramatically, leading to increased compliance costs for enterprises, which is not conducive to achieving the goal of low-cost emission reduction through the ETS. At other times, insufficient liquidity of the market hinders its price discovery and the emergence of consistent and effective price signals.

4.4 Trading Products

The product diversity can facilitate price discovery on the market. Carbon markets have clear attributes of financial markets, and the introduction of derivatives can provide risk management tools for market participants, increase market liquidity, help create market expectations and improve the price discovery function. This will attract more financial institutions, institutional and individual investors to participate in carbon trading, which is crucial to promoting market activities.

Currently, only spot allowances are traded in China' s national ETS, and other products will be introduced in due course to improve the diversity of products and promote price discovery.

4.5 Trading Rules

Trading rules have direct impacts on carbon prices, such as the trading modes, daily price fluctuation limits and market access. The trading modes in the national ETS include agreement transfer and single-way bidding, which will result in differentiated prices. The trading platform sets price fluctuation limits for the different trading modes and the daily price fluctuation limits can be adjusted according to market risk conditions to prevent the drastic price swings.

In terms of market access, a certain number of participants is crucial for securing market liquidity and effective pricing. Institutional investors can provide professional service on the optimal allocation of carbon assets and risk management, while ensuring sufficient capital and trading counterparties in the carbon market. They play an indispensable role in vitalizing carbon assets and enhancing market activities, while contribute to price discovery on the carbon market and improve pricing capability and efficiency. Initially, only the covered entities are granted access to the national ETS, in the future, qualified institutions and individuals will be gradually introduced.

4.6 Information Disclosure

The mandatory information disclosure required by the ETS is an effective tool to ensure openness, transparency, and healthy operation, which also promotes corporate climate information disclosure. Carbon information disclosure can help enterprises manage their carbon assets and identify risks and is the cornerstone of effective government regulation and policy making. Since the ETS is based on cap-and-trade system, it needs to develop clear emission reduction targets to stabilize market expectations and deliver price signals. The determination of emission reduction targets is inseparable from true and reliable carbon information disclosure.

For the national ETS, multiple stipulations regarding information disclosure can be found in *National Measures for the Administration of Carbon Emission Trading (Trial)*. The policy requires regular disclosure of annual greenhouse gas emission reports of key emitters, which is significant in enhancing the transparency of the national ETS, helping to build an efficient trading system and providing a guarantee for fair and transparent carbon prices. It also prompts enterprises to carry out full-scale climate information disclosure and help financial institutions in their climate risk assessments.

4.7 Internal Decision-making of Enterprises

The internal decision-making mechanism of enterprises on carbon trading affects their sensitivity to carbon prices and responsiveness to trading. Clear emission reduction targets and smooth internal workflows are necessary for covered entities to participant in carbon market. Without mechanisms to make prompt responses to market information, enterprises would often experience delay in trading, which is harmful for price discovery.

Challenges for Effective Price Signals in China's National ETS

> The national ETS still faces multiple uncertainties since officially launched. A key issue needs to be considered is how to form stable, clear, and rational carbon price signals in the future. To create a market-oriented pricing mechanism, the national ETS faces challenges in determining emission reduction targets, expanding the scope of participants and diversifying trading products.

5.1 Emission Reduction Targets and Paths to be Clarified for Stable Market Expectations

The EU has made clear roadmaps for each stage quite early before the formal launch in 2005. A series of reform measures have been taken to adjust and regulate the market during its operation, which had a positive impact on carbon prices in the secondary market. Today, the EU ETS, as a relatively mature market, has entered the fourth phase of its stable operation (2021 - 2030), and its carbon price exceeded 62 euros per tonne in early September 2021. One of the main reasons for the continuous rising price in the fourth phase is the more stringent emission reduction targets. Market expects the total supply of allowances will continue to decrease, leading to high carbon prices.

For China' s national ETS, the path for the future is yet unknown. Without emission reduction targets and roadmaps covering the short, medium and long term, the market cannot develop clear expectations and effective price signals cannot be released.

5.2 Scope of Participants to Be Expanded to Increase Market Liquidity

Increasing participant diversity will contribute to the carbon market liquidity. Around the world, successful ETSs not only include covered entities, but also financial institutions, institutional or individual investors and consulting agencies as market participants. Their differentiated risk preferences, market expectations and trading decisions strategies are beneficial for the discovery of fair and just, rational and effective equilibrium prices.

China's national ETS only covered the power sector in the initial stage. In addition, in terms of market access, only the covered entities can participate, while institutional investors and individuals are not yet allowed to trade in the market. In the future, it is necessary to expand the coverage of sectors as soon as possible and expand the scope of participants to include financial institutions, investment institutions and carbon asset management companies, so as to create diversified demand and promote the healthy development of carbon prices.

5.3 Trading Products to Be Diversified to Facilitate Price Discovery

At the initial stage, the only product traded in the national ETS is spot allowances, and there is no price discovery and risk management tools. For other ETSs, they often have developed carbon futures and other derivatives in parallel with the spots, which plays a pivotal role in promoting market activities. In the EU ETS, for example, carbon futures have become the mainstream product, with futures accounting for 92%[6] of its total trading turnover in 2020, while spot only accounting for a small percentage.

Building on steady operation of spots trading, China's national ETS needs to expand the product spectrum. Both spots and derivatives markets should be developed to provide market participants with risk hedging and investment tools.

[6] Data sources: EEX and ICE.

Policy Suggestions

Based on the experience of international carbon markets and China's pilot markets, as well as the development status and challenges of China's national ETS, suggestions for optimizing the pricing mechanism of the national ETS are proposed, covering topics in cap setting, allocation, stability mechanism, market supervision, and product innovation.

6.1 Define Clear Emission Reduction Targets and Moderately Tighten the Cap Gradually

The successful realization of carbon emission reduction goals, which relies on incentive mechanisms, can only be set and improved on the basis of clear-defined targets. Some countries have already raised clear quantified targets in total carbon emissions control. China also needs to quantify its overall targets in a more transparent and stable long-term way to form better market expectation for all participants.

The cap of allowances determines the overall market supply. A cap which is too high will inevitably result in excessively low carbon prices, while if too low, too much pressure will be put on economic development. Therefore, the best approach is a gradual tightening and dynamic adjustment, following the principle of a moderately tight cap of allowances, so as to ensure a reasonable relationship of market supply and demand and a stable carbon pricing.

6.2 Increase the Proportion of Auction to Release Effective Price Signals

Free allocation is the main allocation method in China's carbon markets at present, which would easily cause the absence of price discovery mechanism in allocation. In the EU ETS, auction became the main allocation method since the third stage. RGGI has been allocating by auctioning since the very beginning to send effective price signals to the secondary market.

Considering that the covered entities are not fully prepared to pay for the allowances at the early stage of the national ETS, free allocation is reasonable. However, auction should be adopted as soon as possible with a gradually raised proportion, to promote a clear price signal for the secondary market.

6.3 Diversify Offset Projects and Improve CCER Pricing Mechanism

China's current CCER projects are mainly focused on the renewable energies, among which the wind power projects are the most actively developed, while the emerging biomass power generation projects are also developing rapidly. However, CCER projects are still confined to a small number of fields, thus more types of projects need to be developed to fully leverage the role of emission reduction. Additionally, market access conditions should be made clear, the offsetting process should be improved, and risk control should be strengthened.

According to the development plan of the national ETS, CCER will be traded as a base product after the market enters the stable operation phase. However, based on the pilot experience, the current CCER market is not yet complete, where trading mainly relies on price negotiation, a market-based price discovery mechanism is absent, a big gap exists between the transaction price of CCER and the price of carbon allowances. Therefore, trading and pricing mechanisms for CCER should be further improved.

6.4 Diversify the Market Participants to Improve Market Liquidity

Carbon market is an important market-based approach to achieve emission reduction targets, while the market liquidity and large-scale trading is fundamental for price discovery and promoting energy saving and emission reduction. To expand the market scale and improve liquidity, it is far from enough to rely solely on the compliance demands of covered entities, therefore institutional investors need to be introduced and encouraged to participate in trading.

For China's national ETS, institutional investors should be introduced gradually to diversify the market participants. At different stages, differentiated requirements should be set for institutional investors in terms of qualification, asset investment experience, expertise and risk tolerance. A management system for institutional investors should also be established, which will not only help stabilize the trading activities but also promote the overall robust development of the market.

6.5 Set Up a Flexible Mechanism to Ensure a Balanced Supply and Demand

Many reform measures were implemented upon the issue of imbalanced supply and demand of allowances in EU ETS. The launch of MSR in 2018 has enabled a consistent market expectation of the total amount of allowances and price trend, contributing to a stable upward trend of carbon prices. China can learn from EU ETS and set up a similar flexible adjustment mechanism to balance market supply and demand and ensure a stable and rational carbon price level.

For China's national ETS, stability provisions should be designed in advance in a market-oriented way that ensure the stability and effectiveness of the carbon market without excess intervention. A certain percentage of allowances can be set aside for market stabilization at the allocation stage, with clearly defined conditions for the use of the reserve. In addition, information should be made public in a timely manner to enhance openness and transparency of the market.

6.6 Strengthen Market Supervision, Prevent Insider Trading and Market Manipulation

Insider trading and market manipulation could do great harm to the market operation. It is recommended to carry out market supervision from the following aspects: First, a monitoring and warning system for supply, demand and price flucuations should be established, and contingency plans for supply and price irregularities should be developed. The monitoring innovation based on information technologies is required to achieve early detection of abnormal price fluctuations and improve monitoring quality and timely warning efficiency. Second, a dynamic assessment mechanism for the carbon market should be put in place to regularly evaluate various emerging issues in the market and analyze the factors affecting carbon prices to develop targeted countermeasures. Third, mandatory requirements on carbon market-related information disclosure should be imposed as soon as possible. A complete set of disclosure methods and processes should be introduced. A dedicated electronic information platform should also be built to enhance the efficiency of disclosure while realizing information sharing for better supervision by the public.

6.7 Further improve the data quality of ETS to facilitate corporate climate information disclosure

Data quality is the key to information disclosure, and the authenticity and accuracy of carbon emission data are directly related to government decision-making and the development of the ETS. In October 2021, MEE issued the *Notice on the Supervision and Administration of Data Quality of the National Emission Trading Scheme,* to ensure smooth and orderly operation of the national ETS. At present, the national ETS relies on the National Emission Permit Management Information Platform for carbon emission data submission, filing of monitoring plans, carbon emission data management and analysis, and data verification and supervision, which is conducive to further guaranteeing the authenticity, integrity and accuracy of data. In addition, promoting climate information disclosure through the unified data reporting platform of the national ETS will also enhance the standardization of disclosure and help ensure the consistency and continuity of data.

For mandatory corporate climate information disclosure, in December 2021, MEE issued the *Administrative Measures for the Disclosure of Corporate Environmental Information,* effective since February 8, 2022, which defines the elements of environmental information disclosure requirements, including entities, methods, time limits, contents, and legal liabilities of the parties involved, which guarantees the effective disclosure of environmental information. Enterprises are required to report carbon emissions information, including emission amounts, emission facilities, etc. In July 2021, the People' s Bank of China officially issued the *Guidelines on Environmental Information Disclosure for Financial Institutions,* which set forth requirements on the principles, methods, frequency, and contents of environmental information disclosure for financial institutions, such as banks, securities, and insurance companies. This provides an important basis for them to carry out environmental risk management, identify the environmental impact of their operations, investment, and financing activities and expand green financial innovation.

The 2022 National Ecology and Environmental Protection Work Conference pointed out that the second compliance period of the national ETS should be well managed, and the long-term mechanism of carbon emission data quality management should be improved. In the future, the coverage of the national ETS will be further expanded. On one hand, it is necessary to strengthen the construction of MRV system to enhance the quality of ETS data. On the other hand, it is also necessary to gradually improve the data platform management and further expand its functions, so as to guarantee the effective capture of corporate climate information, thus further improving the quality of carbon data and facilitating information disclosure.

6.8 Explore the Financialization of Carbon Market and Accelerate Innovation of Trading Products

The derivatives market is proven excellent in price discovery and can complement the spot market to develop more rational trading prices that reflect real market conditions. Therefore, while ensuring the smooth operation of the national ETS, it is recommended to gradually explore the financialization of carbon market. Risk prevention and mangaement mechanisms should also be put in place to enhance investors' confidence and willingness to participate in carbon market. Financial institutions such as commercial banks, investment banks, funds and futures companies should be encouraged to actively participate in the market, so as to inject more capital and professional services into the national ETS, thus enhancing the market liquidity and carbon price discovery.

In terms of trading products, it is difficult to achieve qualitative and quantitative improvements only relying on spots. It is necessary to develop derivatives that match the development of the market. Market players should be incentivized to participate in trading and to devote more capital into emission reduction. It is recommended that carbon derivatives market should be developed in phases according to the maturity of the spot market (see Table 6-1).

Table 6-1 Proposed roadmap for development of the trading products in China's national ETS

Stages	Market conditions	Trading Products
Initial Stage	• Sound policy structure and trading rules, solid conditions of spot market • Fair trading, transparency, effective market	**Non-standardized OTC derivatives** that meet the risk control needs of different market participants and connect spot and derivatives trading: • Carbon forwards • Carbon swaps • OTC options
Improvement Stage	• More energy-intensive industries are covered, and the market size is expanded • Market-based pricing mechanism, diversified trading participants • Increased willingness and ability of the entities to participate in the trading of carbon derivatives • State-owned commercial banks enter the market and provide initial liquidity for covered entities by using forwards	Introduce standardized contracts in OTC derivatives, establish a central counterparty settlement mechanism, improve trading efficiency and strengthen market credibility to create **standardized OTC derivatives:** • Standardized carbon forwards
Maturity Stage	• Spots and derivatives markets are further improved • All the eight energy-intensive industries are regulated, and the market is further expanded • Enterprises have rich experience in derivatives trading and can flexibly use them for risk management • Participation of various types of financial institutions, including funds and securities channels capital in volume, thus bringing liquidity and sufficient trading counterparties	**Standardized exchange-traded derivatives** that mitigate risks, hedge and stabilize expectations: • Carbon futures • Carbon options

Institution Introduction

Environmental Defense Fund

EDF
ENVIRONMENTAL
DEFENSE FUND
Finding the ways that work

Founded in 1967 and headquartered in New York, Environmental Defense Fund (EDF) is one of the world' s leading environmental organizations. EDF has more than 2.5 million members, a staff of nearly 700 professionals, and 12 offices around the world including the United States, China, United Kingdom, and Mexico. Areas that EDF works in include: climate and energy, oceans, ecosystems, health, etc. Since inception, EDF has been guided by principles of science and economics to find practical and lasting solutions to the most serious environmental problems.

Shanghai Environment and Energy Exchange

Founded on August 5, 2008, Shanghai Environment and Energy Exchange (SEEE) is China' s first environmental and energy trading platform approved by the Shanghai Municipal People's Government. Following the principle of "innovating environmental & energy trading mechanism and building up the industry chain of environmental protection services" , SEEE has been actively engaging in trading of rights in energy conservation, emission reduction and environmental protection. Its business covers carbon emission trading, CCER trading, carbon forwards, carbon finance and carbon consulting services.

SEEE is the designated platform of Shanghai ETS pilot, and is also a trading platform for CCER registered at the National Development and Reform Commission. After China' s national ETS officially commenced trading in July 2021, SEEE has been entrusted with the responsibility of developing, operating and maintaining the trading system. Seizing the opportunity of the official operation of the national ETS, SEEE positions itself as "One Exchange with Three Major Functions and Five Centers" and strives to build itself into a carbon trading and pricing center with international influence.

Environmental Defense Fund
—Beijing Representative Office

No.28, Andingmen East Street, Dongcheng District, Beijing, China

+86-10-64097088

http://www.edf.org

http://www.cet.net.cn

Xiaolu Zhao

Director, Global Climate

zhaoxiaolu@cet.net.cn

xzhao@edf.org

Ying Wang

Manager, Global Climate and Green Finance

wangying@cet.net.cn

yiwang@edf.org

Shanghai Environment and Energy Exchange

B1, No.121, North Zhongshan No.1 Rd, Shanghai China

+86-21-56903000

http://www.cneeex.com

info@cneeex.com

Jin Li

Deputy General Manager; Senior Economist

lijin@cneeex.com

Qianyun Zhang

Assistant Director of Strategy and R&D Center

zhangqianyun@cneeex.com