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The progress and prospects of China’s national emissions trading scheme

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Policy position of China's national ETS

Sept. 25, 2015 "U.S.-China Joint Statement on Climate Change"

- Announced to start the national ETS in 2017 (in reality, formal construction started from the end of 2017)

Sept. 22, 2021 "Opinions on fully and accurately implementing new development philosophy and achieving carbon peak and carbon neutrality" (CCCPC and State Council)

- As the general direction, stated that the construction of a national carbon market will be accelerated; scope of the market, types of products and trading modes will be gradually expanded; and, management of emissions allowances allocation will be improved.

Oct. 24, 2021 "Action Plan for Peaking Carbon Emissions before 2030" (State Council)

- To accelerate the development of a unified carbon emissions statistics system; play the role of national carbon market; improve related systems; expand the target industries; promote the establishment of energy use and electricity markets; and, enhance coordination among various market mechanisms.

To improve the national ETS with positioning it as a pillar policy for achieving carbon peak and carbon neutrality

Source: Compiled by the author based on relevant information.

10 years from local pilots to launch the national market

National

10/2011 Notice issued to start the pilots

2013-2015 Notices on measurement and reporting guidelines (24 sectors)

2016 ~ MRV of annual emissions in 8 industries

12/2017 National ETS construction plan announced

12/2020 Issued management measures & allowance allocation plan

16/07/2021 Started online trading in the national market

Providing lessons and experiences

Pilots

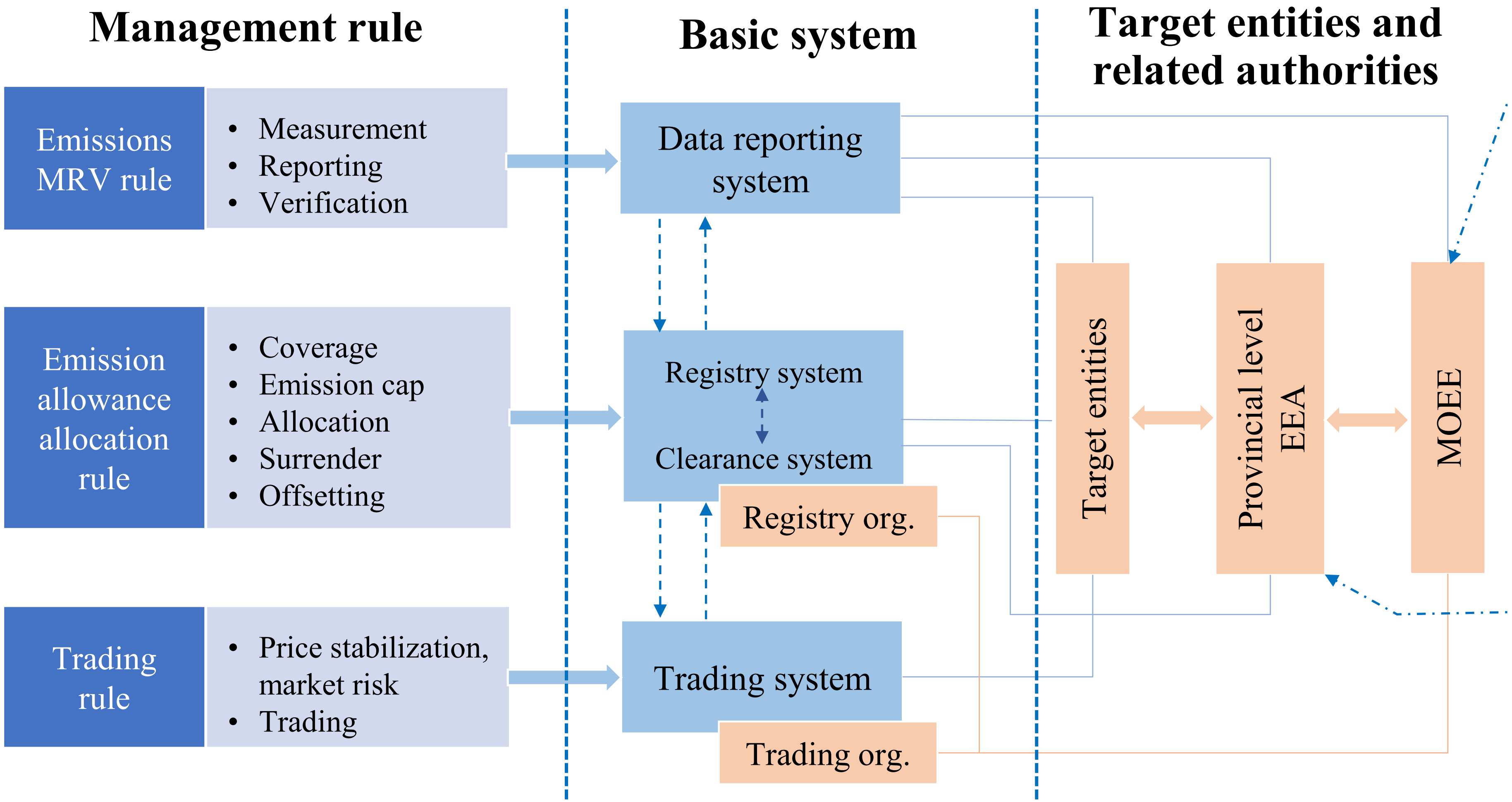
2013 Shenzhen, Shanghai, Beijing, Guangdong, Tianjin

2014 Hubei, Chongqing

2016 Fujian, Sichuan (not pilots, agreed by the national government)

Source: Compiled by the author based on relevant information.

Overall framework of China’s national ETS



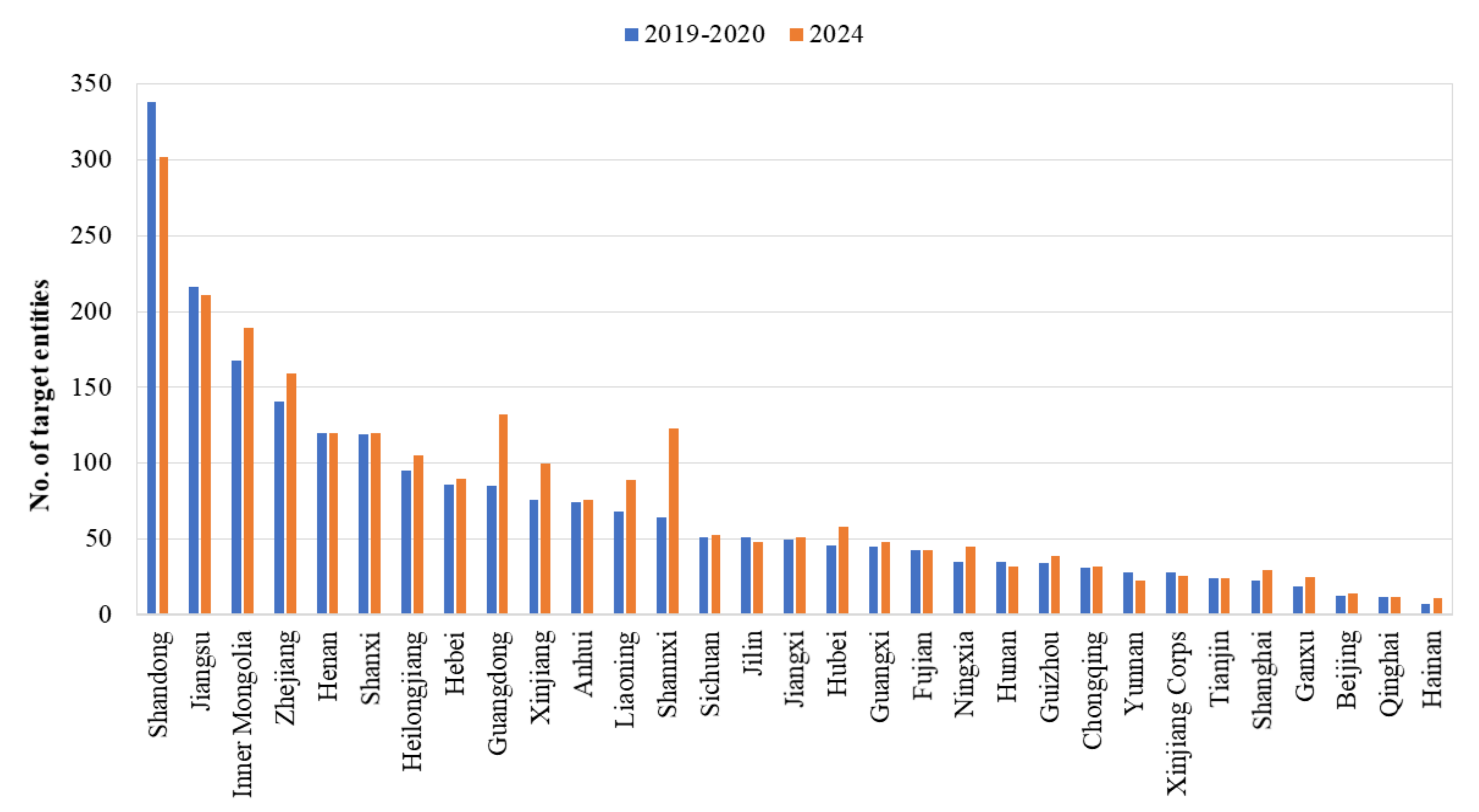
‘Interim Ordinance on the Management of Carbon Emissions Trading’
(State Council, issued on 25/01/2025)

- Supervision and management of carbon emission trading and related activities
- Propose the types of GHGs and industries to be covered for the approval by State Council
- Formulate the criteria for determining key emission entities
- Formulate annual allowance setting and allocation plan
- Establish a national carbon market management platform

- Formulate a list of key emission entities annually in their region
- Responsible for the verification of annual emissions reports submitted by key emission entities
- Allocate emission allowances to key emission entities in their region

Target entities and the coverage of China's national ETS

- Criteria of target entities: Companies with annual emissions (confirmed by the latest verification) being 26,000 t-CO_2 and above.
- Covered a total of 2,225 key emitting entities in power generation sector during 2019 and 2020 → Actually 2,162 entities.
- The No. of key entities became 2,430 in 2024, with annual CO_2 emissions of around 5.1 billion tons and a coverage rate of around 40%.
- The target sectors have been expanded to 3 other industries: iron & steel, cement and aluminum smelting (1st compliance by the end of 2025).
- The target entities are increased to around 3,700, with annual emissions of around 8 billion t-CO_2, and a coverage rate of over 60%.



No. of target entities in power generation sector by region (2019-2020 and 2024).

Source: Compiled by the author based on relevant information.

Benchmarks of power generation units under China's national ETS

No. of category	Power supply ($t\text{-}CO_2$/MWh)			Power generation ($t\text{-}CO_2$/MWh)		Heat supply ($t\text{-}CO_2$/GJ)				
	2019-2020	**2021**	2022	2023	2024	2019-2020	**2021**	2022	2023	2024
I	0.877	**0.8218**	0.8177	0.7950	0.7910	0.126	**0.1111**	0.1105	0.1038	0.1033
II	0.979	**0.8773**	0.8729	0.8090	0.8049					
III	1.146	**0.9350**	0.9303	0.8285	0.8244					
IV	0.392	0.3920	0.3901	0.3305	0.3288	0.059	0.0560	0.0557	0.0536	0.0533

Unit category: I: Conventional coal-fired unit above 300 MW class; II: Conventional coal-fired unit of 300 MW class and below; III: Unconventional coal-fired unit burning coal gangue, coal slime, coal water slurry (including coal-fired circulating fluidized bed unit); IV: Gas turbine.

Sources: MOEE (2020); MOEE (2023); MOEE (2024).

- A significant change of benchmarks for power and heat supply by coal-fired power units in 2021 from 2019-2020 (power supply: 6-18% ↓; For heat supply: over 10% ↓).
- No change of benchmarks for gas turbine power supply in 2021.
- Benchmarks of 2024 were further but very slightly tightened from 2023 levels.

Compliance of key emitting entities under China’s national ETS

The 1st compliance period (2019-2020)	Effects observed from the 1st period	Compliance of the 2nd period (2021-2022) and 2023
• CEA share of 4 types of units: 32.4:48.3:18.4:0.9 • 1,833 key entities fully fulfilled obligations and 178 entities could fulfil partially. → An overall compliance rate: 99.5% • Around 32.73 million tons of CCER were used for the offsetting	• Questionnaire to 2,162 key entities with 735 responses • Over 80% appointed full-time staffs to manage carbon assets • Nearly 90% have given a greater emphasis on data quality and management • 45.7% planned to use the revenues for mitigation	• CEA for 2021 and 2022: 5.096 and 5.104 billion t-CO_2 • Verified emissions: 5.094 and 5.091 billion t-CO_2 → Balanced CEA supply and demand • Compliance rates of 2021, 2022 and 2023: Individually 99.61%, 99.88% and 99.98%

Sources: MOEE (2022); MOEE (2025).

Trading modes, entities and products in the national carbon market

Trading modes

Listing trading with agreement

- Minimum declaration amount set at less than 100,000 t-CO_2.
- Fluctuate by a maximum of 10% of the closing price on previous trading day
- Trading hours are Monday to Friday from 9:30 to 11:30 AM and 1:00 to 3:00 PM (excluding holidays and non-business days)

Bulk trading with agreement

- Minimum declaration amount set at no less than 100,000 t-CO_2
- Fluctuation range of the trading price set at 30%
- Trading hours are Monday to Friday from 1:00 to 3:00 PM (excluding holidays and non-business days)

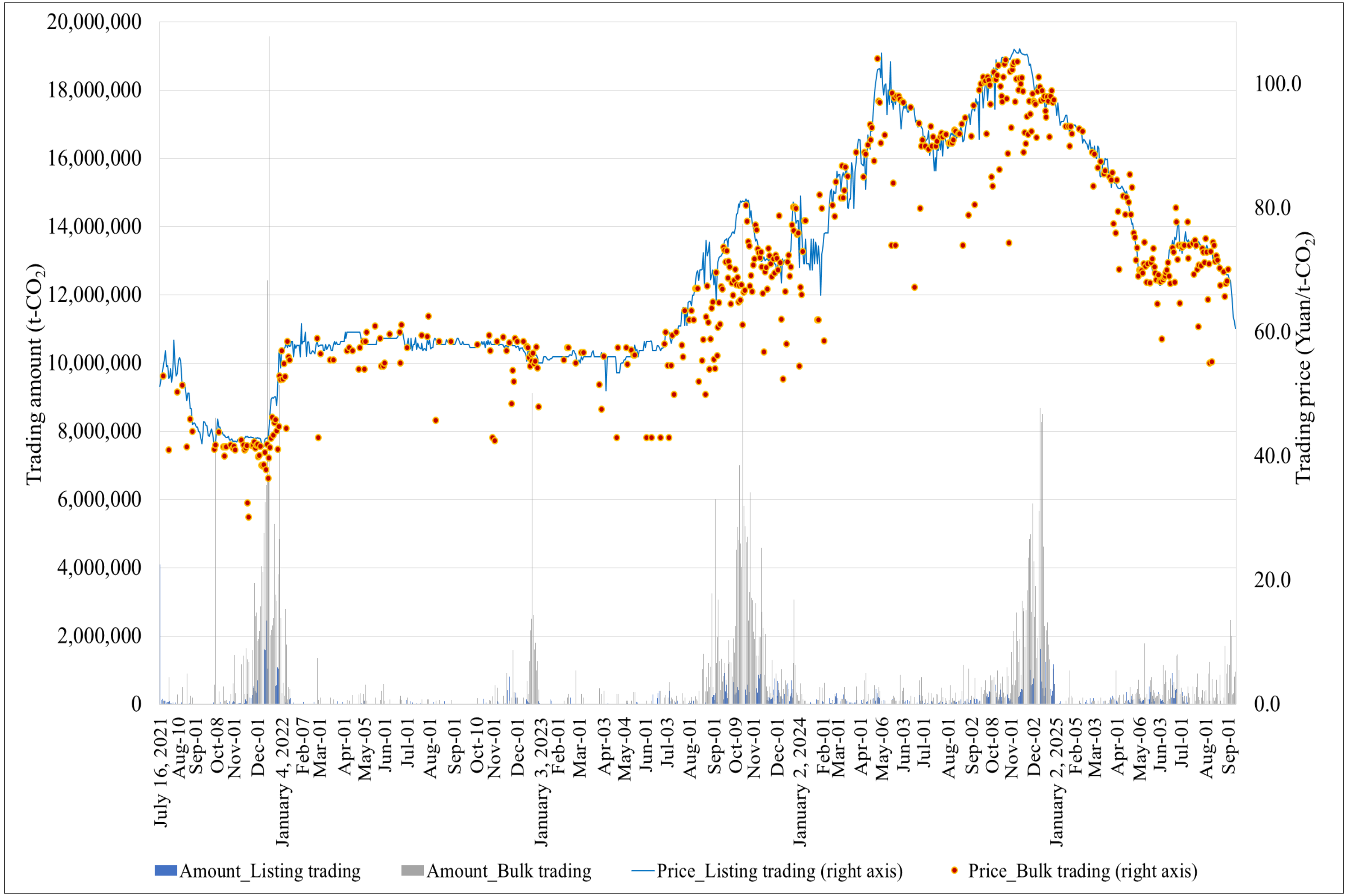
One-way bidding

- Market entities applying for one-way bidding can buy emission allowances from the counterparts, with the bidding information released by the exchange
- Started from June 30, 2025

- Currently, trading product is only CEA (China emission allowance), and market entities are only the target companies.
- One market entity holds one account, but can apply for multiple operators and corresponding operation permissions.

Source: Shanghai Environment and Energy Exchange Co., Ltd. (2021; 2025).

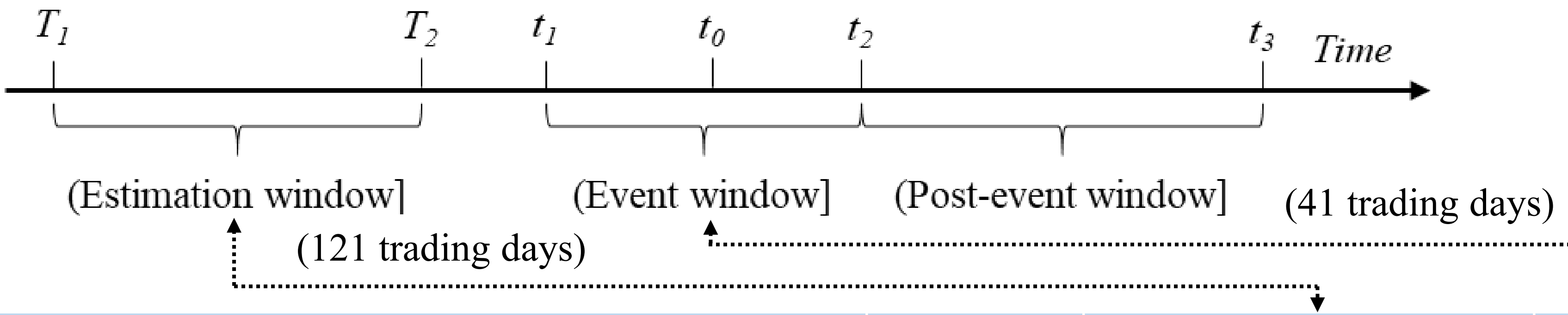
Operation result of China's national carbon market



- Still at an early stage and the trading purpose is mainly for compliance.
- Significant increases in trading volume in the period immediately before the compliance deadline.
- The accumulated trading amount: Around 707.2 million t-CO_2; Total transaction amount: Around 48.57 billion Yuan; Average carbon price: Around 68.7 Yuan/t-CO_2 (by September 10, 2025).
- Daily carbon prices were stable at around 60 Yuan/t-CO_2 during January 2022 and July, 2023, and showed an increasing trend till November 2024. Then the prices are decreasing back to slightly over 60 Yuan/t-CO_2.
- Share of listing trading: 19.0% by trading amount and 20.3% by transaction amount.

Source: Compiled by the author based on data from Shanghai Environment and Energy Exchange.

Timeline of an event study and events considered for the analysis



No.	Event	Date	Estimation window	Event window
1	Notice on emission allowances settlement in the initial compliance period	26/10/21	16/07/21-28/09/21	12/10/21-07/12/21
2	Release of draft emission allowances allocation plan for 2021 and 2022 for public comment	03/11/22	14/04/22-13/10/22	20/10/22-15/12/22
3	Release of emissions allowances allocation plan for 2021 and 2022	15/03/23	22/08/22-22/02/23	01/03/23-27/04/23
4	Notice on emission allowances settlement in 2021 and 2022	17/07/23	22/12/22-26/06/23	03/07/23-28/08/23
5	Release of “Interim Ordinance on Carbon Emissions Trading Management”	05/02/24	20/07/23-15/01/24	22/01/24-27/03/24
6	Release of emissions allowances allocation plan for 2023 and 2024	15/10/24	24/09/24-26/11/24	21/03/24-13/09/24

Test result of price overreaction in China's national carbon market

- The market price indicates an overreaction to the notices on emission allowances settlement (event No.1 and No.4) and, the release of emissions allowances allocation plan and the interim management ordinance (event No.3, No.5 and No.6).
- Market transparency and information disclosure should be improved.
- Capacity building for the target entities should be enhanced and the participation of institutional investors should be allowed to maintain price stability.

The result of price overreaction to the considered events

No. of event	Average price volatility ($\bar{V}$)	$V_t - \bar{V}$				
		Mean	Std. dev.	t-value	p-value	Degree of freedom
1	**2.27%**	**-0.0184**	**0.0058**	**-20.38**	**0.000*****	**40**
2	0.52%	0.0002	0.0067	0.14	0.445	40
3	**0.42%**	**0.0054**	**0.0222**	**1.57**	**0.062***	**40**
4	**0.64%**	**0.0123**	**0.0206**	**3.83**	**0.000*****	**40**
5	**1.90%**	**0.0088**	**0.0265**	**2.12**	**0.020****	**40**
6	**1.74%**	**-0.0087**	**0.0166**	**-10.04**	**0.000*****	**40**

Note: *, ** and *** denote a significance level of 10%, 5% and 1%, respectively.

Efforts for China’s national carbon market in the near future

Mandatory carbon market

- Expand market coverage
- Improve emission allowances management
- Enhance the management of pilot markets, and won’t establish new local or regional market

Voluntary GHG market

- Speed up the construction of voluntary emission reduction market
- Actively promote the utilization of CCER

Vitality of carbon market

- Enrich the products for trading
- Expand trading entities
- Strengthen the supervision of trading market

Capacity building

- MRV of emissions
- Full-process management of data quality
- Technical service organizations
- Information disclosure system

By 2027: 1) The national mandatory carbon market covers major emission industries; 2) The national voluntary GHG reduction market covers key areas.

By 2030: 1) Mandatory market with overall controlled emission allowances, and free and paid allocation; 2) Voluntary market in line with international standards; 3) A carbon pricing mechanism with significant effect, sound management and reasonable prices.

Source: CCCPC and State Council (2025)

Thank you for the kind attention!