

## Review of China national carbon market in 2022

The contents are authorised by the Carbon Research Team of Refinitiv under the CET programme partnership. The contents are all directly cited from the *Refinitiv Carbon Market Year in Review 2022 Report*, which only represent the data and opinions of the authors' organisation.

The year 2022 marked the first full year that China's national ETS was operational, as trading began in H2 2021. Trading was limited compared to more established carbon markets, especially in Europe and North America. Throughout 2022, the program continued without the Chinese government having released a new allocation plan or having relaunched its domestic offset program. Though the Chinese pilot ETS – some of which have been active since 2013 – continue to operate, they saw a significant drop in volumes during 2022 as power sector emitters switched increasingly to the national ETS.

### Textbox: How does China's ETS work?

China's national ETS is the largest in the world in terms of covered emissions – trading began in July 2021. Only power generators have a compliance obligation for now, but the scope will expand in the coming years with sectors like cement and non-ferrous metals likely to be added. Power generation is such a large contributor to China's overall greenhouse gas output that in its current scope the ETS already covers annual emissions close to 4.5 billion tonnes (Gt) of carbon dioxide per year - around 40 percent of China's total emissions. All power plants emitting more than 26,000 tonnes of carbon dioxide per year are covered – that is more than 2,000 compliance entities, including those generating combined heat and power, as well as captive power plants of other sectors.

The big difference between China's ETS and other carbon trading programs is that the former is intensity-based, with the cap being adjusted according to actual production levels. While the EU ETS and other programs hold covered entities accountable for their absolute emissions (measured in tonnes) and decide the overall cap many years into the future (2030), Chinese firms' compliance obligation relates to their carbon intensity measured in emissions per unit of production. In the power sector, the intensity ratio is tonnes carbon dioxide per unit of electricity generated – it is thus not pre-set to a fixed declining trajectory over time.

China started pilot emission trading systems in selected cities and provinces in 2013, to gather experience in view of creating a national system. These are still operational, with emitters complying by surrendering allowance and offset units unique to their individual program (Table 3).

In terms of actual transactions, trades are conducted electronically. Only spot transactions are allowed - no futures or other derivatives. Transactions are referred to as either listed trades (trades on screen at the exchange) or OTC bulk trades (bilateral OTC trades which cleared on exchange at the end of each session). The latter occur in minimum batches of 100,000 allowances by mutual agreement.

Currently, only covered entities may trade - financial institutions and other non-compliance entities are not yet allowed to participate in the market, although the Chinese government has indicated this may change at a later stage.

### National ETS in its second year

China's national ETS entered its second year of trading in 2022, with transactions having begun in H2 2021. The year 2022 is the second half of the program's second compliance period covering the emissions of over 2,000 power sector entities during 2021 and 2022. The first compliance period ran from 2019-2020, and covered entities had to surrender allowances for their emissions over those two years by the end of 2021 – they will have to surrender allowances for their 2021 and 2022 emissions by the end of 2023. Since 352 million surplus allowances remained from the first compliance, China's Ministry of Ecology and Environment (MEE) did not allocate allowances for the second compliance period yet. This meant only a few tradable allowances were in circulation, which in turn made for low liquidity.

The development of the market was slowed by the resurgence of the covid pandemic, which delayed or postponed several key ETS decisions and announcements by the government. In March, the MEE released a notice about reporting requirements for entities' 2022 emissions, but its timeline was postponed by three months. Requirements for each province to disclose a list of its covered entities and third-party verification bodies was delayed until the end of September. In late December, the MEE published two guidance documents: one on emission accounting and reporting, and one on emission verification.

The release of the most crucial element of China's ETS, its allocation plan for the second phase originally intended to be finalized in 2022, was also postponed: the MEE published a draft allocation plan only in early November. The draft proposes a drop of at least 6.5 percent for the carbon intensity benchmarks (that determine companies' compliance obligations, see the Textbox) compared with the benchmark in 2019-2020, meaning the overall stringency of the program is tighter going forward. The public consultation phase for the draft ended on 12 November, but the final allocation still has not been announced.

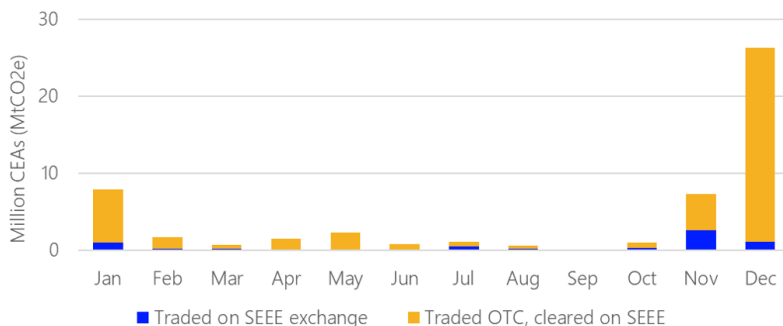
Another key element for the national ETS, the pilot ETS, and indeed any carbon market activity going forward is standardisation of emission accounting. Currently, China lacks a unified methodology for greenhouse gas emissions tallying – this compromises data quality and comparability among regions and entities. In August 2022, the National Development and Reform Commission (NDRC) released comprehensive plans for a nationwide standardised carbon emission accounting system to be put together over several years via a cooperation among government departments. Observers predict this could draw out the timeline for e.g. expanding the scope of China's national ETS to include further sectors, and for allowing additional players (financial institutions and other non-emitters) to trade.

### National ETS: Low volumes, rising price

The national ETS began 2022 in a relatively inactive phase, as the first compliance period had been completed and the new allocation plan (for the second compliance period) had not even been drafted. Over 2022, a total of 51 million Chinese Emission Allowances (CEAs) changed hands: 6 million in the form of "listed trades" on the exchange and 45 million over-the-counter but cleared on the exchange (see Figure 1). This represents a 70 percent decrease in volume compared to 2021, even though trading in 2021 only occurred for six months rather than an entire year.

Prices, however, went up compared to 2021. The weighted average price of a CEA over the year 2022 was RMB 55.30/t (~€8), nearly 30 percent higher than the weighted average in 2021. Allowances closed at RMB 55 (~€8) per tonne on the last trading day of the year, up 1.4 percent from their price on the last trading day of 2021. Applying the respective average prices to total volume for each type of transaction, listed transactions accounted for an annual turnover of about RMB 358 million (~€49 million) and bilateral (OTC) transactions' annual turnover was RMB 2,456 billion (~€336 million) for a grand total Chinese national ETS market value of €385 million. This is down 62 percent from last year, where CEA transactions were collectively worth over €1 billion.

Figure 1 Chinese national ETS: Monthly traded volumes over 2022



Source: Refinitiv, accessed in April 2023

Table 1 China carbon market sugments 2019-2022

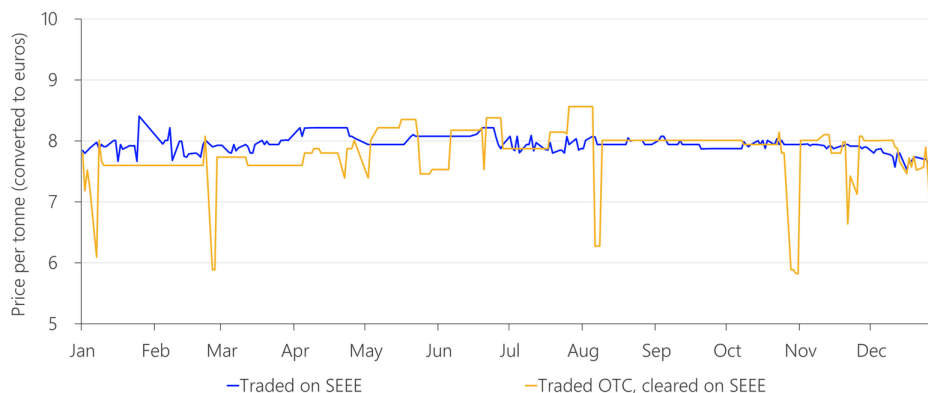
Pilots	2019		2020		2021		2021	
	Mt	€ Million	Mt	€ Million	Mt	€ Million	Mt	€ Million
CEAs	N/A	N/A	N/A	N/A	179	1003	51	385
Pilots (combined)	87	250	71	257	64	286	52	370
CDERs	43	N/A	63	N/A	170	N/A	9	N/A
Total*	130	N/A	134	N/A	412	1289	112	N/A

\* Volume includes allowance units for pilot ETSs and for national ETS. Plus CCERs. Value includes only allowance units for pilots and national ETS (CCERs are mainly traded OTC, there is no source for full overview of prices). Transactions of local offsets units in the separate pilots are of very modest size and not included in our assessment.

China's national ETS operated for a total of 50 weeks, or 242 trading days, in 2022 - from 4 January to 30 December.

- January saw a spike in volume and prices, with the firms that had not yet completed their compliance for the first phase transacting CEAs to do so. This activity drove the price of CEAs on 28 January to its highest level since the program started: RMB 61.38/t (~€8).
- From February to October the market saw very little action as China's policymakers focused on the pandemic and other priorities, leaving covered entities in limbo in terms of regulatory decisions (such as the allowance allocations) that would have clarified their compliance needs. More than 40 percent of the trading days during this period saw fewer than 100 CEAs change hands.
- November and December, on the other hand, accounted for two-thirds of the entire 2022 traded volume. Increased activity in this period was due to the MEE releasing the draft allocation plan on 3 November: the tightening of the baseline caused expectations of a dearth of CEAs going forward, which in turn made for more purchasing activity. A damper to this end-of-year rally was provided by the impending Chinese Lunar New Year of early 2023: companies began selling their CEAs for more flexible cash flow to optimize their financial situation and prepare for employee bonuses.

Figure 2 CEA prices in 2022 (unit: euro/t, exchange rate: 1EUR = 7.24 RMB)



Source: Refinitiv, accessed in April 2023

## Pilot ETS trading dwindles

China's pilot markets are still operational, running in parallel to the national ETS. Large emitting companies in various sectors other than power generation are still regulated by their respective pilot systems. From 2022, the national carbon market officially included eligible power generations of all the pilot regions: these were exempted from compliance with the national ETS in 2021 because they had already received allowances from their respective pilot ETS and completed compliance there. Thus, traded volumes in the pilots decreased – the regional markets have begun to expand by covering more sectors. Just over 25 million tonnes traded in all the pilot ETS combined in 2022, continuing the downward trend from 2021 (see Table 2).

Table 2 Chinese pilots ETS trading summary 2022

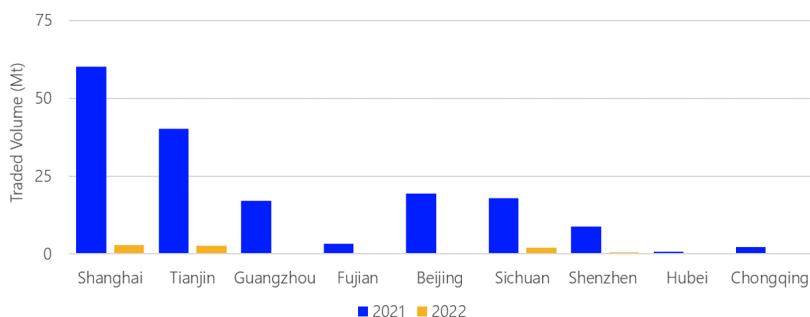
Pilots	2022 Annual			Changes 2021-2022		
	Volume (Mt)	Value (€ Million)	Average Price (€/t)	Volume	Value	Price
Guangdong	14.45	145.78	10.09	-47%	6%	102%
Hubei	7.39	45.19	6.11	4%	49%	44%
Tianjin	5.45	26.78	4.91	-7%	14%	23%
Beijing	3.75	48.45	12.93	-37%	1%	60%
Shanghai	3.19	23.52	7.37	110%	193%	40%
Chongqing	4.33	21.57	4.98	-42%	-9%	57%
Shenzhen	5.30	32.85	6.20	-12%	270%	320%
Fujian	7.66	26.18	3.42	253%	312%	17%
Total	51.52	370.32	7.19	-19%	30%	60%

Note: Volume includes both exchange-traded and OTC transactions. Differences in the way OTC transactions were assessed/reported account for the difference in volume figures cited for 2021 in this report and last year's report on those same annual volumes.

Regardless of volume traded, the price of allowances remained firm in most of the pilot ETS due to the timely allocation of allowances by the authorities to adjust the market's supply and demand. Beijing pilot ETS allowances remained the priciest, at one point reaching RMB 149/t (~€20) in 2022. Beijing's pilot also saw its first auction in 2022, with 17 enterprises successfully bidding for 961,138 tonnes (Beijing Emission Allowances or BEAs) at the reserve price of RMB 117.54/t (~€16). Pilots in which allowances prices had typically been lower saw increases over 2022, with prices approaching those of allowances in the national ETS. Some of the pilot ETS saw significant price changes due to adjustments in their mechanisms. The average price of allowances in Shenzhen's program, for example, tripled compared to 2021 - this was due to regulators "recategorizing" allowances previously priced separately by vintage year into one standard contract.

Chinese offset units, known as China's Carbon Emission Reductions or CCERs, are eligible both in the pilot ETSs and in the national ETS. As covered entities are allowed to account for up to five percent of their compliance obligation with offsets (rather than CEAs) in the national ETS, nearly 33 million CCERs were "used" (cancelled) in the first compliance period. Regulators had indicated that the national CCER registry and other associated market infrastructure – currently "on hold" - would relaunch in 2022. This did not happen, leaving inadequate supply and thus low traded volume: estimates of the amount of CCERs in circulation range from only 7 to 17 million. CCER transactions shrank drastically in all pilots. However, more pilots created and authorized offsets eligible only in their regional markets – this expands on the trend in recent years of pilots offering (in addition to CCERs) offsets unique to their region that are only accepted for compliance to the local ETS.

Figure 3 CCER trading in pilots 2022 and 2021



Source: Refinitiv, accessed in April 2023

Despite the emergence of more types of offsets, overall offset transaction volumes remained low in 2022. The transition of pilot programs' power sector emitters to the national ETS clearly had the same effect on offset transactions as it had on allowance transactions: far fewer offsets changed hands than in 2021. Transactions of Beijing Parking Certified Emission Reduction (PCER), for instance, took place on only two trading days in 2022. The Puhui Certified Emission Reduction (PHCERs) used in Guangdong's Pilot ETS also had a sluggish year, with the transaction volumes falling by over 95 percent from over 1 million tonnes in 2021 to 38 thousand in 2022. Shengtai Certified Emission Reduction (STCER), another offset in the Guangdong pilot ETS, also saw no transactions in 2022. Only volumes of Fujian Forestry Certified Emission Reductions (FFCER) in Fujian's pilot ETS saw increased volumes, with 398 thousand tonnes traded in 2022.

Table 3 Local offsets eligible in various Chinese pilot ETS

Offset Mechanism	Issued Province/City	Traded Volume (Tonne)	Price Range (€/t)	Allowed for Compliance
Forestry Carbon Sequestration (林业碳汇)	Beijing	0	Not disclosed	Yes
PCER (机动车减排量)	Beijing	30378	Not disclosed	Yes
FFCER	Fujian	398000	average price: 2.45 €/t	Yes
PHCER	Guangdong	38114	1.73 - 4.23 €/t	Yes
STCER	Guangdong	0	Not disclosed	No
CQCER	Chongqing	1324282	2.88 - 5.74 €/t	No

## Outlook for 2023

With the imminent finalization of the Chinese national ETS allocation plan and its stricter benchmarks, we expect CEA prices to go up in 2023 on expectations of a tighter supply/demand. We also expect the CCER relaunch to happen in 2023, making for increased offset trading and potentially higher prices.