China’s National Emissions Trading System: Lessons from Regional Pilots and the Way Forward
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SYNOPSIS
China’s national emissions trading system (ETS), officially launched in 2021, is considered an important policy instrument for China to achieve its climate mitigation targets. Considering it is the largest carbon trading market in the world despite the limited sectors covered, its successful implementation with the expansion of sector coverage is expected to make a significant contribution to reducing not only China’s carbon emissions but also global carbon emissions. This Policy Brief discusses how China’s national ETS has been designed with the experiences of regional pilot ETSs and what challenges should be addressed to raise its effectiveness.

KEY POINTS
• China has implemented eight regional ETSs since 2013, and these pilots have served as testing beds for creating a national ETS, which became operational in 2021.
• Heated debates over the design of the national scheme, responsibility transfer, and concerns over Chinese economy hindered the quick implementation of the national ETS.
• China’s national ETS has been designed based on lessons gained from the regional pilots but has taken a gradual approach, regarding sector coverage, allowances allocation, and compliance rules, based on the consideration of the national context.
• Several challenges, such as increasing emissions coverage and carbon prices, ensuring robust and transparent measurement, reporting, and verification (MRV) processes, and building a solid legal basis and good governance, should be addressed for the effective implementation of ETS.

INTRODUCTION
China pledged its updated climate change mitigation targets, to peak its carbon dioxide (CO₂) emissions before 2030 and achieve carbon neutrality by 2060 in its updated nationally determined contribution in October 2021. Along with other various carbon emissions mitigation measures, China launched, in July 2021, its national emissions trading system (ETS), a market-based policy tool that limits the permissible levels of carbon emissions of individual emitters and allows trading of emissions allowances or permits between the emitters. According to Refinitiv, a total of 194 million tonnes of China Emission Allowances were transacted during the first year between July 2021 and July 2022. The national scheme has been designed based on lessons gained from the experimental implementation of eight Chinese regional pilot ETSs with different settings, which have been implemented since 2013. Such a learning process is expected to help reduce the trial and error of the national ETS, but several challenges remain in raising its effectiveness.

ANALYSIS
Regional Pilot ETSs as Experiments and Launch of National ETS
When the Chinese government considered introducing an ETS in the late 2000s and early 2010s, all existing ETSs had operated in developed economies. Given that the specific mechanism of a country’s ETS tends to depend on the socioeconomic development level and carbon emissions profile, the mechanism
design of ETS of China as a developing country with a socialist market economy needed to differ from those developed countries’ schemes. Thus, China has decided to implement regional ETSs as pilot trials in order to accumulate experience in ETS operation and draw implications for the design of the nationwide scheme. In 2011, the State Council declared its aim to create carbon trading markets, and the National Development Reform Commission (NDRC) authorised the establishment of regional ETSs in seven cities and provinces. Beijing, Guangdong, Shanghai, Shenzhen, and Tianjin ETSs entered into effect in 2013, followed by Chongqing and Hubei ETSs in 2014. Later, Fujian province launched China’s 8th regional ETS in 2016.

Along with the implementation of the regional pilots, the preparation for establishing national ETS has gradually been done since late 2013. After several studies and statements expressing its aim to launch the national ETS, the Chinese government officially announced the development of the national ETS and the working plan for this, in December 2017. This plan showed a significant divergence from the previous plans regarding the sector coverage. Initially, eight energy-intensive industries, namely, aviation, building materials including cement, chemical, non-ferrous metals, petrochemical, power generation, pulp and paper, and steel had been selected to be covered by the ETS. However, in the development plan in 2017, the government kept only the power sector for the initial phase of national ETS. The Ministry of Ecology and Environment (MEE) issued interim regulations, trial rules for its national ETS, and cap setting and allowance allocation plan successively between 2019 and 2020. Finally, national ETS started operation in July 2021. As the national ETS was implemented in the electricity generation sector, the power plants which had been covered by the regional ETSs have shifted to the national ETS scheme.

Meanwhile, the implementation of China’s national ETS was realised after a couple of times of postponements. The government needed time to formulate basic principles for the national scheme. There had been heated debates over whether the government should start a top-down national system or establish regional ETSs in all areas. Also, there has been an argument that the ETS design should consider regional differences. After long deliberation, the government decided to set up the national ETS using unified rules for all regions. Preferential treatment for industries in the less developed western region was avoided in order to prevent the race to the bottom. Moreover, a shift of responsibility for climate change policy and carbon market from NDRC to MEE in 2018 following government restructuring was a primary reason for the delay. The responsibility transfer needed time and incurred additional costs due to the transfer of experienced staff between the Ministries, capacity building for new staff, and different views about the ETS design and objectives between NDRC, the main body in charge of economic growth and planning and MEE, overseeing environmental management and protection. Besides, economic slowdown owing to the COVID-19 pandemic also have dampened the pace of ETS preparation.

**China’s National ETS Design: Combination of Lessons from Regional Pilots and National Context**

The design of national ETS was based on previous experience with various carbon projects and ETS, including the Clean Development Mechanism projects and sulphur dioxide trading. The main contributor was the experience with the regional ETS pilots. As the pilot regions vary considerably in their development levels and industrial structures, their ETSs show significant diversity in the mechanism design, including sectoral coverage, emissions thresholds, cap setting, allowance allocation methods, and compliance rules. It enabled the government to assess how trading systems could work in vastly different settings. The national ETS shares operational similarities with some regional ETSs showing promising results. However, not all effective features of the regional ETSs have been incorporated into the national ETS. The government had to relieve concerns over the negative economic impacts that national ETS might have and facilitate coordination between ETS and other energy and climate change policies. Hence, China’s national ETS has taken a gradual approach from generous regulation in the initial phase to stricter and more ambitious regulation in the later phase.
First, although the national ETS had planned to be applied to the eight energy-intensive industries, it currently covers entities whose annual emissions are 26,000 tonnes of CO₂ equivalent (tCO₂e) or more in the power generation sector only, with a plan to expand the sector coverage in the coming years. The reduction of sector coverage led to a fall in the number of covered entities from more than 10,000 to 2,162 and a decrease in emissions coverage from 50% to 40% of China's total emissions. This exemption has been attributed to national economic conditions and industrial structure. With a high share (60%) of coal in the generation mix, the power generation sector accounted for the largest share (40%) of China's national emissions. Also, this sector was more controllable by the government because electricity generation in China is dominated by state-owned firms. Moreover, the relatively complete statistics in the power sector made the ETS implementation easier by ensuring the availability of reliable emissions-related data. Unlike the power sector, other sectors were still in the process of establishing their emissions dataset. Lastly, there have been serious concerns over the cost burden on certain industries, such as aluminium and steel, which suffered from weak prices due to declined demand and a supply glut.

Second, allowances are allocated mainly for free in the initial phase, and auctions will be introduced gradually. The regional pilots have shown that an auction might be useful for efficient ETS, but a high financial burden would make companies reluctant to join the carbon market. In fact, Guangdong ETS had to reduce the floor price for auctions repeatedly. A further challenge with auctioning is related to revenue recycling. Guangdong province has tried to earmark the revenue from auctions for developing and supporting low-carbon projects but faced strong objections from the local finance authorities, arguing the revenue should be added to the general budget. As a result, the national ETS adopted free allocation of allowances conducive to achieving a high compliance rate by minimising the cost burden on companies. For free allocation methods, while most regional pilots have used grandfathering and benchmarking together based on historical emissions or emissions intensity, the national ETS adopted a benchmarking approach based on actual outputs of installations with an intensity-based cap to improve coordination between the ETS and other climate and energy policies.

Third, relatively substantial financial penalties for non-compliance have been established. Regional pilots have tested both financial and non-financial penalties. In many regional pilots, high financial penalties for non-compliance were difficult to be imposed due to legal constraints. However, it also has been found that loose enforcement mechanisms, including low financial penalties and the lack of an information disclosure system, would lead to low compliance from companies. Moreover, some companies did not consider the enforcement a credible threat and evaded non-compliance penalties. Thus, the Chinese government set a plan to impose similar levels of fines to the regional pilots for non-compliance in the initial phase and increase them considerably: from CNY 10,000-30,000 (SGD 1,930-5,790) to CNY 50,000-200,000 (SGD 9,650-38,600) for not submitting a report and from CNY 20,000-30,000 (SGD 3,860-5,790) to CNY 100,000-500,000 (SGD 19,300-96,500) for failing compliance obligations.

Besides, the measurement, reporting and verification (MRV) system has been developed based on the experience of regional pilots. In developing sectoral guidelines for carbon emissions accounting and reporting, MRV rules and experiences in the pilots were a critical reference, and the relevant pilot experts were involved intensively. The national scheme also allows offsets up to 5% through the China Certified Emissions Reductions, certified by the Chinese government, similar to the regional pilots.

Challenges to Be Addressed

Extensive emissions coverage and high carbon prices are generally considered necessary conditions for effective carbon pricing schemes. Regarding this, China’s national ETS needs to be refined. On the one hand, the government may add the sectors covered by ETS to broaden the emissions coverage. The Chinese government aims to incorporate the seven remaining sectors into the scheme by the end of 2025, but specific plans and timelines for this expansion have not been announced. Another way is encouraging
entities in the power sector to participate in the carbon market. Whereas the compliance rate of national ETS in terms of emissions was 99.5% in 2021 (i.e., the first compliance period), the compliance rate in terms of the number of entities was 85%. It means that some smaller power generators have not finished their obligation within a period.

Low carbon prices also have been pointed out as a challenge that China’s ETSs have faced. The highest prices of the regional pilots and national ETS in 2022 were respectively USD 20.8 (SGD 28)/tCO₂e in Beijing ETS and USD 9.7 (SGD 13)/tCO₂e. The current price level in China’s national ETS market, USD 8.2 (SGD 11)/tCO₂e on average in 2022, is insufficient to meet the globally required price level and one of the lowest levels among ETSs in the world. Such a low carbon price will not motivate companies to decarbonise their business operations. Therefore, rules for higher carbon prices, such as decreasing the share of free allowances, introducing an auction mechanism, and setting the price floor like Beijing ETS, need to be considered.

Robust and transparent MRV processes are also essential for effective ETS operation. Unlike other ETS markets where third-party auditors verify emissions, in China, ecological and environmental authorities of provincial governments take care of the verification of emissions reports submitted by companies. They review the reports and require third-party verification for any dubious data. This system raised concerns about the government officials’ technical capacity and conflicts of interest regarding state-owned enterprises in the power sector.

In addition to the mechanism design, building a strong legal basis and good governance will drive the successful implementation of the national ETS. Current regulations to manage the national ETS are ministerial decrees, which cannot establish strong compliance rules. NDRC and MEE have tried to set up State Council-level regulation since 2015 but are still awaiting approval. Coordination between NDRC and MEE is also a key challenge. When the government was reshuffled in 2018, the responsibility for ETS and climate change policies shifted from NDRC to MEE. This decision was changed again in 2021. Currently, NDRC oversees setting carbon emissions reduction targets while MEE retains responsibility for the national ETS and carbon market. Their coalition and cooperation will be critical to harmonise ETS and other climate change and energy policies and targets.

**CONCLUSION**
China’s national ETS is the world’s largest carbon market covering one-seventh of global CO₂ emissions, 4.5 billion tCO₂e, even though it only covers the power sector. This is three times greater than the coverage of the EU ETS, the second-largest carbon market. Despite quite low carbon prices, the sheer magnitude of emissions covered makes this scheme very important to meet national and global climate targets. If the covered sector expands, its role is expected to become more crucial in the international efforts to combat climate change. Further development and improvement of mechanisms and governance with proper monitoring and evaluation will increase its effectiveness in reducing carbon emissions.

**WHAT TO LOOK OUT FOR**
- Evolution of the national ETS design
- Trend in national ETS carbon prices
- Integration of regional ETSs with the national ETS
- Impacts of ETSs on emissions reduction at the regional and national level in China

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