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# Emissions trading in China: Progress and prospects

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## HIGHLIGHTS

- We summarize the history of China's climate policy and milestones in China's ETS development.
- We provide a comprehensive overview of the current status of China's seven ETS pilots.
- We discuss some key issues and challenges related to the implementation of the ETS pilots.
- We identify next steps to support development of a national ETS in China.

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## ABSTRACT

To control rising energy use and $CO_2$ emissions, China's leadership has enacted energy and $CO_2$ intensity targets as part of the Twelfth Five-Year Plan (the Twelfth FYP, 2011–2015). Both to support achievement of these targets and to lay the foundation for a future national market-based climate policy, at the end of 2011, China's government selected seven areas to establish pilot emissions trading systems (ETS). In this paper, we provide a comprehensive overview of current status of China's seven ETS pilots. Pilots differ in the extent of sectoral coverage, the size threshold for qualifying installations, and other design features that reflect diverse settings and priorities. By comparing the development of the ETS pilots, we identify issues that have emerged in the design process, and outline important next steps for the development of a national ETS.



## 1. Introduction

With the highest energy use and greenhouse gas emissions of any nation (International Energy Agency, 2012), China has begun to adopt comprehensive approaches to control its $CO_2$ emissions. At the end of 2011, policymakers announced plans to develop a domestic emissions trading system as a more cost-effective, market-based and internationally compatible mechanism for emissions reduction. As a step in this direction, the body responsible for climate change policy under China's State Council, the National Development and Reform Commission (NDRC), selected seven provinces and cities—Beijing, Tianjin, Shanghai, Chongqing, Hubei, Guangdong and Shenzhen—to establish pilot emissions trading systems (ETS) during the Twelfth Five-Year Plan (FYP) (National Development and Reform Commission, 2011).[1] The seven ETS pilots are required to launch before the end of 2013 and fully initiate trading by the end of 2015 (National Development and Reform Commission, 2011).

The NDRC has moved relatively quickly to establish the ETS pilots. The preparation and launch of the seven ETS pilots was set to take place in under three years (2011–2013). This is a short time frame considering that the EU-ETS was fully operational after more than seven years of preparation.[2] As China's ETS pilots begin to launch, there is great interest in understanding how each will develop and will compare to existing systems abroad.

This paper is organized as follows. In Section 2, we summarize the history of China's climate policy and milestones in China's ETS development. In Section 3, we provide a comprehensive overview of the current status and design of the seven ETS pilots, relying on news announcements, recent literature, and our own interviews. In Section 4, we discuss some key issues and challenges facing the implementation of an ETS in China. Section 5 offers conclusions and recommendations.

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[1] Beijing, Tianjin, Shanghai and Chongqing are municipal cities with the same status as provinces, and Hubei and Guangdong are provinces. Shenzhen is a city of Guangdong, but is also classified as a special economic zone.

[2] Measured from the time of publication of the report "Towards an EU Post-Kyoto Strategy" by European Commission in 1998 (European Commission, 1998) to the passage of legislation in 2003 (European Commission, 2003) and to the launch of EU-ETS Phase I Test Period in 2005, the EU took seven years to launch the EU-ETS.

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## 2. Background

Climate policy in China has the support of the country's top leadership. Premier Wen Jiabao's commitment to reduce national $CO_2$ emissions intensity by 40–45% by 2020 compared to 2005, announced at the 2009 Copenhagen climate talks (Xinhuanet, 2009), signaled a milestone in China's climate policy and prompted domestic efforts to design appropriate policies. China's recent steps to develop pilot emissions trading systems en route to a national system build on many years of experience with policies targeted at fossil energy use, including energy efficiency and conservation measures under previous Five-Year Plans and active participation in the Clean Development Mechanism under the Kyoto Protocol.

China has a long history of national policies targeting energy use. Historically, the country's Five-Year Plans have included national energy intensity targets. More recently, after decades of declining energy intensity, signs of reversal in this trend led the government to set binding targets for energy intensity reduction for the first time during the Eleventh Five-Year Plan (the Eleventh FYP, 2006–2010) (State Council, 2006). The target was disaggregated to different levels of government as well as to state-owned enterprises (SOEs), and target achievement was newly adopted as a component of performance evaluations for government officials and leaders of SOEs. These measures increased emphasis on improving systems for monitoring, reporting and verifying energy use. Under these policy initiatives, significant investment from the government promoted the diffusion of energy-saving technology and the growth of the energy performance contracting industry. During this period, the government relied heavily on command-and-control measures. To achieve compliance, over short periods a number of provinces forced large segments of industrial capacity to shut down as part of eleventh-hour efforts to meet the energy intensity targets (Lo and Wang, 2013). Observing the high and concentrated costs of such measures, policy makers have since increasingly focused on market-based measures such as an ETS to minimize the cost of achieving the Twelfth Five-Year Plan targets for reducing energy intensity and, for the first time, carbon intensity, in line with China's long term climate change policy goals.

China's experience with carbon markets dates to the introduction of the Clean Development Mechanism (CDM). In 2005, a regulation authorizing CDM participation originated with the support of the NDRC, Ministry of Science and Technology (MOST), Ministry of Foreign Affairs (MFA) and Ministry of Finance (MOF) (National Development and Reform Commission, 2005). By April 2012, China had become a dominant player in the CDM market with 51% of all registered CDM projects (Maraseni, 2013). By encouraging enterprises to document GHG savings and covert them to Certified Emission Reductions (CERs) for sale on international emissions exchanges, the CDM increased the familiarity of Chinese government officials, enterprises, and third-party verifiers with market-based mechanisms. In recent years, persistently low prices in the EU-ETS have made participation in the CDM far less attractive for project developers. However, the CDM has simultaneously established several key elements of a domestic carbon market. Fig. 1 provides an overview of developments in China's carbon policy, with emphasis on those paving the way for an ETS.

In terms of basic features, China's seven ETS pilots overlap and diverge in important ways. All are located in relatively developed regions with low emissions intensity compared to the national average. Most of them were previously selected as low-carbon development pilot areas (National Development and Reform Commission, 2010). At the same time, they represent a relatively large geographic distribution (as shown in Fig. 2), and differ in terms of economic scale, GDP per capita, and emissions per capita. To illustrate this diversity, we list some key indices in 2010 for the

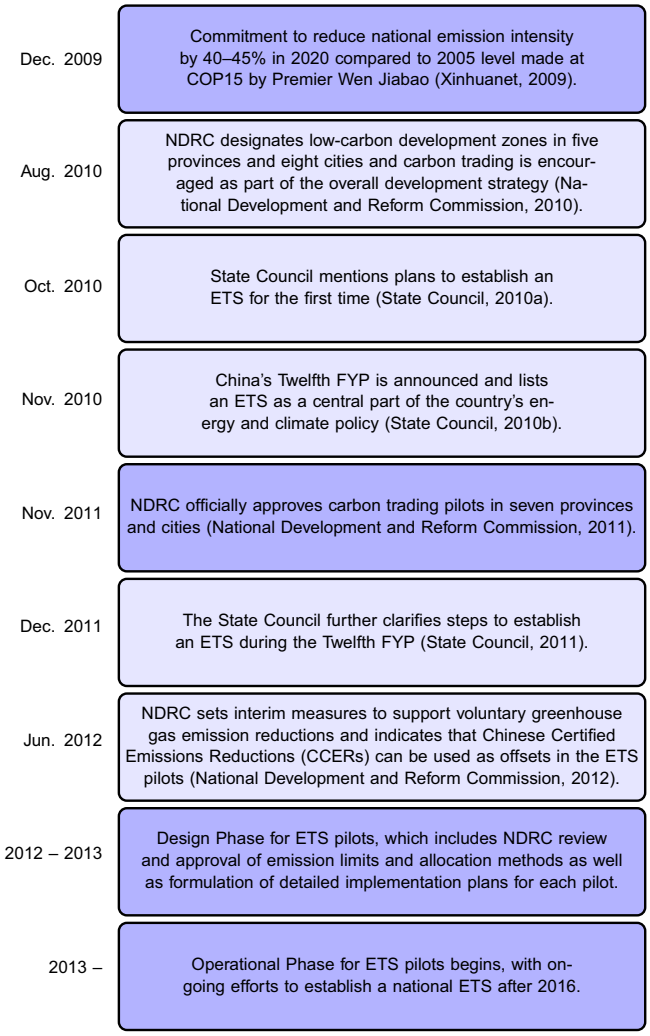


**Fig. 1.** Developments in China's ETS design in the context of national carbon policy (Xinhuanet, 2009; State Council, 2010a, 2010b, 2011; National Development and Reform Commission, 2011, 2012; State Council, 2011).

ETS pilots in Table 1. Table 1 also presents the aggregate targets for China and the EU-ETS as a point of comparison.

Based on the comparison in Table 1, we can see that most of the seven ETS pilots cover relatively affluent regions in China, and have higher per-capita GDP than the national average (Chongqing and Hubei are slightly below the national average). At the same time, most of their carbon intensities are lower than the national average, although there is still a more than twofold difference between the lowest (Shenzhen with 0.6 $tCO_2$/k$) and the highest (Hubei with 1.4 $tCO_2$/k$). $CO_2$ emissions per capita in each pilot also vary widely. However, emissions per capita in Hubei, Guangdong, and Chongqing are still relatively low. China has set national carbon intensity targets for 2015 and 2020 whereas Europe sets absolute targets (20% reduction in GHG emissions in 2020 compared to 2005). The share of coal consumption in China is high relative to the EU, contributing to the challenge of meeting the China's 2020 target.

## 3. Overview of China's ETS pilots

China's ETS pilots are in an early stage of development. While the NDRC has suggested that an absolute cap on national $CO_2$ emissions with trading across provinces is a long-term goal, the pilots are intended to build experience and identify challenges that should be resolved before moving to a national system. Pilot