



Research on China's cap-and-trade carbon emission trading scheme: Overview and outlook



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HIGHLIGHTS

- A full and concise review of the literatures on China's ETS.
- Mechanism design, coordination and linkage and impact assessment are involved.
- Policy suggestions are offered for devising China's nationwide ETS.
- Pressing research areas in the future are identified.

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ABSTRACT

With important implications for global climate change mitigation, the development of a cap-and-trade emission trading scheme (ETS) in China is embedded in distinctive political, economic, and institutional contexts and has been attracting increasing attention in recent years. To offer a clear perspective on current research progress, this paper systematically reviews the recent literature on China's ETS from three main aspects: mechanism design, policy and regional linkages, as well as impact assessment. The current research consensus are summarized based upon detailed literature analyses and commentaries, and together with observations of international experience and China's actual condition, the paper provides policy proposals for the development of China's national ETS during 2016–2020. Finally, several important controversies in the current literature are discussed with regard to the practical demands of China's ETS development. Five pressing topics that need to be further studied in the coming years are highlighted, including cap setting, allowance allocation among sectors and enterprises, carbon pricing, policy package and unified carbon market construction, as well as ex-ante and ex-post impact assessments.

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1. Introduction

Cap-and-trade emission trading schemes (ETS) have become one of the most important strategic programs used by China to achieve its targets of energy conservation and carbon emission mitigation. In March 2011, China's Twelfth Five-Year Plan proposed to promote the applications of market-based mechanisms in the fields of energy conservation and emission reduction, and to gradually establish a domestic carbon trading scheme [1]. The pilot regional cap-and-trade ETSs in seven provinces and cities were announced at the end of 2011 and were successively put into operation between 2013 and 2014. Afterwards, the main focus of the project gradually shifted to the expansion of existing regional pilots and the exploration of cross-regional linkages, such as the proposed Beijing-Tianjin-Hebei and the Yangtze River Delta schemes [2]. In December 2014, China's National Development and Reform Commission (NDRC) drew up a plan to establish a nationwide cap-and-trade ETS for 2016–2020 [3]. Thus far, China's ETS pilots have covered 743 Mt CO₂-e emitted by more than 2000 enterprises [4], second only to the EU-ETS. With the development moving from regional pilots to a nationwide scheme, the cap-and-trade ETS of China is highly expected to play increasingly important roles not only in its domestic energy conservation and carbon emission reduction, but also in the global carbon trading and climate change mitigation.

Carbon emission trading is a market-based policy instrument, which has the advantages in cost effectiveness, emission-reduction reliability, political acceptability, low-carbon energy and technology incentives, coordination with other policies and potential for internationalization [5–8]. The cap-and-trade ETS is a mandatory allowance-based emission trading mechanism and has become the main focus of current global carbon trading systems. Its application was first implemented by the European Union (EU) and has been disseminated widely since then. The EU ETS, Regional Greenhouse Gas Initiative (RGGI), Tokyo ETS, California ETS and Quebec ETS were all established between 2005 and 2013, and proved to yield satisfactory results in practice [8–11]. It should be noted, however, that all of the existing well-functioning ETSs are operated in developed economies, whose mechanism designs may not be suitable for developing countries

[12]. As the largest carbon emitter and the biggest developing economy, the construction and operation of cap-and-trade ETS in China is faced with a distinctive political-economic-institutional context and the related challenges. Currently, the development of China's ETS is in its infancy, and therefore the process of testing and assessment through practice is still ongoing. Against this background, an increasing number of researchers have begun to focus on China's cap-and-trade ETS in recent years. This paper intends to contribute to the literature in three ways: providing a clear and systematic perspective on the current progress of research; offering policy recommendations on developing China's forthcoming national ETS; and giving insights about the areas in urgent need of further study over the coming years.

The paper consists of two main parts. Sections 2–4 represent the first part, involving a systematic review of recent researches concerning China's cap-and-trade ETS,¹ mostly from the last six years. Although discussed from various aspects, the literature can be generally divided into three major categories of research: ETS mechanism design, ETS linkage and ETS impact assessment, all three of which are also the focus of this paper. More specifically, Section 2 reviews recent researches on ETS mechanism designs from each of the regional, sectoral and national levels. Among them, the five topics regarding the national-level ETS design receive the utmost attention due to their great importance for informing the establishment of China's national ETS during 2016–2020. Section 3 proceeds to deal with ETS linkage, further demonstrating how to coordinate the ETS with other policies and how to link fragmented regional carbon markets to develop a unified market. Following these, Section 4 summarizes impact assessment studies on either pilot regional ETSs or the prospective national ETS, providing further details on what effects the ETS may yield in China. On the whole, these three sections clarify the most up-to-date research progress and critical issues that remain unresolved in the field of China's ETS. Based upon the systematic literature review and commentary, Sections 5 and 6 constitute the second part of the paper, shedding light on China's national ETS establishment and navigating future research directions for

¹ Since the coverage of the study is the ETS based on cap-and-trade mechanism, the term of "ETS" will be used to indicate "cap-and-trade ETS" in the following context whenever misunderstanding will not be incurred.

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