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# Korea's emission trading scheme and policy design issues to achieve market-efficiency and abatement targets



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## HIGHLIGHTS

- Emission Trading Scheme (ETS) will be implemented from 2015 in Korea to reduce CO<sub>2</sub>.
- ETS performance substantially depends on structural design.
- We provide policy overview on the current framework of Korean ETS.
- Several policy design issues are discussed for developing policy consistency.
- We focus on allowance allocation, allowance reserve and market stabilization measures.

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## ABSTRACT

In 2008, the government of Republic of Korea (Korea) announced the national abatement target aiming at 30% reductions from the Business-as-Usual projections by 2020. Accordingly, the Emission Trading Scheme (ETS) will be implemented from 2015 onwards. As ETS performance substantially depends on the structural design, it is critically important to examine the details of Korean ETS for the achievement of cost effectiveness and concurrent development of an active emission trading market. This paper addresses several policy design issues for this purpose. After providing an overview on the current framework of Korean ETS, we propose ways to achieve flexibility, consistency and market efficiency of the program in consideration of the preexisting policies. Issues in policy design are discussed by focusing on allowance allocation, market stabilization measures and price mechanism in the emission and energy markets in Korea. This paper will serve as a practical guideline for establishing sustainable and market-efficient Korean ETS that can be compatible with the international standards as in the EU ETS.

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## 1. Introduction

Increasing concerns on climate change are not an exception in the Republic of Korea (hereafter, Korea) which has recorded sharp economic growth for the past several decades along with a consequential increase of energy consumption. The greenhouse gas emission from Korea accounts for approximately 2% of the global emission, and its average annual growth rate for the past 8 years is 2.7% which is the highest one among OECD countries. Although the energy intensity has been steadily improved from 0.277 TOE/GDP in 2000 to 0.246TOE/GDP in 2010 (IEA, 2012)<sup>1</sup>, the absolute level of CO<sub>2</sub> emission is consistently increasing mostly due to the growing economic activities. In addition, it is undeniable to

argue that the increasing electrification, which has been intensified by a relatively low electricity price in Korea, triggered further increase in energy demand and CO<sub>2</sub> emission.

In response to the calls for international efforts to reduce CO<sub>2</sub> emission, the Korean government announced the national abatement target in 2008, according to which CO<sub>2</sub> emission must be reduced by 30% based on the 2020 Business-as-Usual (BAU) emission<sup>2</sup>. The Emission Trading Scheme (ETS), which is scheduled to be introduced in 2015 in Korea, is expected to be one of the pivotal policy instruments for achieving the national abatement targets, as manifested by the EU experience. A carbon tax is not generally suggested as

<sup>2</sup> The initial BAU emission calculation was largely based on the top down approach which compiled the national statistics data. There is no yet determined rule for updating the BAU emission. The BAU emission in 2020 is 776.1MtCO<sub>2</sub>e and the national emissions target is set at 543.1MtCO<sub>2</sub>e by 2020 which thus exceeds 1990 levels (289.5MtCO<sub>2</sub>e) by almost 90%.

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<sup>1</sup> TOE per US\$1,000.

a policy tool in Korea, because there have been strong discontents against the introduction of a new tax. Although there is a widely recognized consensus that ETS will play a significant role in promoting green growth as well as low carbon society in Korea (Newell et al., 2013), there have not been considerable discussions regarding the legislative proposals on ETS. Notably, a weak understanding of the environmental policy design may undermine the performance of ETS since its outcomes substantially depend on the structural design of the program (Stavins, 1998). A meta-analysis for numerous Computable General Equilibrium (CGE) models which analyze the effects of ETS/carbon tax in Korea finds that the implementation of these policies to comply with the national abatement target would result in approximately 1~3% of GDP costs whereas a well-designed policy scheme coupled with revenue recycling and international linkage may contribute to lowering the GDP costs (Park, 2012).

Hence, it is important to examine the current scheme of Korean ETS to identify the main challenging design issues in order to cost-effectively achieve the national abatement targets as well as to develop an emission market. In the course of enacting the Korean ETS, the governance problem among the involved government agencies has emerged as a complex issue that could eventually undermine the ETS performance. It must be noted that governance conflicts are the precursors of policy program conflicts by compromising the fundamental spirits embedded in the market-incentive mechanism of ETS. The legislative proposal for ETS requires an integrated attempt for policy coordination to reconcile the governance problem that ensures the consistency and credibility of the allowance system (De Perthuis and Trotignon, 2014); further such efforts will with no doubt contribute to the successful international linkages of Korean ETS as well as a concurrent achievement of economic efficiency and environmental objectives.

This paper addresses several policy issues to serve the aforementioned purpose of Korean ETS. After providing an overview on the current legal framework of Korean ETS, we explore ways to achieve flexibility, consistency and market efficiency of the program in consideration of the pre-existing policies. We discuss the policy design issues focusing on allowance allocation, new entrant reserve, the role of power sector, market stabilization measures and price policies in Korea's emission and energy markets. This paper will serve as a practical guideline for establishing sustainable ETS, which will be market-efficient and compatible with international standards as in the EU ETS.

The paper is structured as follows: Section 2 provides a brief overview on the national abatement target in Korea and policy instruments, focusing on the direct regulation system and ETS. Section 3 examines the main design issues associated with the current version of Korean ETS: allowance allocation, allowance reserve, market stabilization measures and the role of emission trading market and power sector. The summary and concluding remarks are provided in Section 4.

## 2. Overview of the Korean emission trading scheme

The Korean government signed and ratified both the United Nations Framework Convention on Climate Change (UNFCCC) and

the Kyoto Protocol in order to tackle climate change issues, and has developed and materialized this purpose into a national vision. The national target for the reduction of greenhouse gas is to reduce the national greenhouse gas emissions by 30% from the BAU projection in 2020. This target has been incorporated into the Framework Act on Low Carbon, Green Growth (the Framework Act) and its presidential decree entering into force on April 14, 2010. This Act attempts to provide the legal basis of the paradigm shift along with the basic principles on how to harmonize the concepts of Low Carbon Society and Green Growth Economy. The government shall establish the target for the reduction of greenhouse gases as well as the target for energy saving and efficiency. The Target Management System (TMS) was first set up to accomplish these targets.

TMS is one of command and control policies for regulating directly the greenhouse gas emissions and energy efficiency of the controlled entities that are classified into seven sectors in the national economy system. The first designation of controlled entities under TMS was completed in 2010 and the reduction target for 2012 was set in 2011. The reduction targets for controlled entities are set by the grandfathering method. The year 2012 was the first year of mitigation implementation and then emissions/implementation reports for 2012 were submitted by March 2013. These reports are required to be verified by third parties such as verification bodies, and then the controlling department. The Ministry of Environment will evaluate the reports. Table 1 shows the criteria for becoming a controlled entity by satisfying two requirements – greenhouse gas emissions and energy consumptions – at the same time.

The average emission for the past three years prior to the designation year is used for the designation in TMS as well as in the ETS. A corporation, whose average emissions in the past three years before year  $T$  exceeds the threshold, will be designated as a controlled entity under the TMS in year  $T$ , and accordingly reduction targets will be set in year  $T+1$ . The implementation and supervision for the abatement activity will be scheduled in year  $T+2$  and the statement and the report of the implementation will be submitted by March 31st in year  $T+3$ . The Ministry of Environment plays a primary role of establishing and managing TMS as a General Management Department, and other associated Ministries take part in as sectoral controlling departments in order to take the necessary measures for TMS. The sectoral controlling departments oversee their specified sectors as follows: (1) Ministry of Agriculture, Food and Rural Affairs (MAFRA): agriculture and livestock farming; (2) Ministry of Trade, Industry & Energy (MOTIE): manufacturing industries and power generation; (3) Ministry of Environment (MOE): wastes; and (4) Ministry of Land, Infrastructure and Transport (MOLIT): buildings and transport. A total of 470 companies were designated as controlled entities in 2010, and the number of controlled entities increased to 580 in 2012. Approximately 450 companies are in the energy/industrial process sector. These controlled entities are the potential participants of ETS. The emissions data of controlled entities which are based on the ex-ante annual report are presented in Table 2.

According to the MOE, the reduction amount reached 21.3MtCO<sub>2</sub>e as a result of the implementation of reduction target in 2012. From 2015 onwards, TMS which is a command and control instrument will

**Table 1**  
Criteria for designation of controlled entities.

	January 2010–December 2011		January 2012–December 2013		January 2014	
	Company	Place of business	Company	Place of business	Company	Place of business
Emissions (ktCO <sub>2</sub> e)	≥ 125	≥ 25	≥ 87.5	≥ 20	≥ 50	≥ 15
Energy (TJ)	≥ 500	≥ 100	≥ 350	≥ 90	≥ 200	≥ 80

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