

# *Critical Review of Recent Changes to the Emissions Trading Scheme in South Korea: From the Perspective of Corporate Climate Strategy*

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## **Abstract**

To reduce greenhouse gas emissions cost efficiently, the South Korean government initiated emission trading scheme in January 2015. This study has surveyed and evaluated the recent changes in the Korean emission trading scheme and found that it has limitations to promote proactive corporate climate strategies. Although various factors affect corporate climate strategies, the regulation is one of the important company-external factors that brings innovative practices to reduce CO<sub>2</sub> emissions. Recently, the overall control on emission trading scheme was devolved to Ministry of Strategy and Finance from Ministry of Environment. In addition, the amendments in the Enforcement Decree of the Act on the Allocation and Trading of Greenhouse Gas Emission Permits will likely to lead to delays in corporate climate practices by allowing the use of allowances from the subsequent years. Therefore, recent changes in emission trading scheme and climate policies in South Korea are likely to result in corporates' reactive responses to climate change mitigation.

## Contents

1. INTRODUCTION.....	39
2. THEORETICAL FRAMEWORK: CLIMATE STRATEGIES OF CORPORATIONS.....	40
2.1. Corporate Climate Strategies .....	40
2.2. Factors in Corporate Climate Strategies .....	41
2.3. Impacts of Regulations on Corporate Climate Strategies .....	43
3. KOREAN EMISSIONS TRADING SCHEME.....	44
3.1. Brief Description of Korean Emissions Trading Scheme .....	44
3.2. KETS Practice in Its First Year and a Half .....	47
3.3. Recent Changes in the KETS and Relevant Climate Policies.....	48
3.3.1. Changes in the Enforcement Decree of the Framework Act of Low Carbon Green Growth.....	48
3.3.2. Changes in the Enforcement Decree of the Act on the Allocation and Trading of Greenhouse Gas Emission Permits.....	49
4. ASSESSMENT OF ONE YEAR EXPERIENCE OF EMISSIONS TRADING SCHEME IN SOUTH KOREA .....	50
5. CONCLUSION .....	51

### 1. INTRODUCTION

South Korean greenhouse gas (GHG) emissions were 694.5 million tons of carbon dioxide equivalent (MtCO<sub>2</sub>eq) in 2013. They had increased by 137.6% since 1990 when total emissions were 292.3 MtCO<sub>2</sub>eq. This increase is continuous with 2013 emissions at 1.5% above than of the prior year (GIR, 2015). CO<sub>2</sub> emissions from South Korean fuel combustion ranked 7<sup>th</sup> in 2013 while its GDP was 14<sup>th</sup> in the world (IEA, 2015; UN, 2015). This gap between CO<sub>2</sub> emissions and the size of the economy can be attributed to the manufacturing sector accounting for a more significant share of the South Korean economy than it does in other countries. As of 2013, the total output of its manufacturing sector accounted for 49.4% of the national economy (Bank of Korea, 2015).

To reduce GHG emissions, South Korea implemented a national cap-and-trade program on January 1, 2015. Although it is not required to reduce its emissions under the international climate regime, South Korea implemented this program to cost-efficiently achieve the target of reducing GHG emissions to 20% below the business-as-usual (BAU) levels by 2020. The Korean Emission Trading Scheme (KETS) accounts for 68% of total national emissions. During the one and a half years since the start of the program, the Korean carbon market has not been active, and companies have filed suits against the government because the allowances are smaller than what they expected to receive.

Climate regulations, such this emission trading scheme, promote corporate climate strategies that include opposing the implementation of the policy or lobbying policymakers to make the policy more favorable to them. However, corporations also take progressive approaches regarding climate mitigation by investing in innovative technologies. These climate mitigations or CO<sub>2</sub> reduction activities vary across firms, including practices such as enhancing the production process, installing carbon capture and storage facilities, or improving energy efficiency.

Recently, the government has amended the KETS and related climate mitigation policy structures. This study aims to evaluate whether the recent legal and structural changes in the KETS will stimulate proactive corporate climate change strategies or promote innovative practices in firms. To accomplish this research goal, this study reviews some relevant government documents, trading data, and existing studies. Also, the author conducted phone interviews and email surveys with a government official at the Ministry of Strategy and Finance (MOSF) and staff at the Greenhouse Gas Inventory and Research Center of Korea (GIR).

This paper is organized as follows. In the following section, corporate climate strategies are defined, their patterns are surveyed, and factors that explain companies' responses and activities will be explored. In section 3, the KETS is briefly discussed in terms of its design,

actual practice over the first one and half years, and the recent changes. In section 4, the recent amendments to the KETS and related climate policies will be evaluated from the perspective of whether these changes can orient corporate climate strategies in a sounder environmental direction. In the conclusion, the contributions and limitations of this study will be discussed.

## 2. THEORETICAL FRAMEWORK: CLIMATE STRATEGIES OF CORPORATIONS

### 2.1. Corporate Climate Strategies

In business literature, strategy refers to “setting long-term goals, developing activities, and allocating resources that will enable the firm to achieve these goals” (Cadez and Czerny 2016: 4133). A corporate climate change strategy refers to the management of firms’ CO<sub>2</sub> emissions (Cadez and Czerny, 2016). Terms such as carbon strategies or carbon management strategies are also used to capture a series of activities firms use to manage CO<sub>2</sub> emissions. Beyond the practices or activities to reduce CO<sub>2</sub> emissions, Gulbrandsen and Stenqvist (2013) stated that corporations’ climate strategies could be a more comprehensive concept. They added two additional components, “recognition of the problem of responsibility in mitigation of greenhouse gas (GHG) emissions” and “manifestation of company responsibility for problem-solving, expressed by a target for reducing GHG or CO<sub>2</sub> emissions and related monitoring activities” (517).

While Cadez and Czerny (2016) used “climate change mitigation strategies” rather than “climate change strategies” or “carbon strategies” to clarify the scope of their study, this study follows Eikeland and Kkjaerseth (2013) and Gulbrandsen and Stenqvist (2013) in using “climate change strategies” to define the pattern of activities aimed at reducing CO<sub>2</sub> emissions. Also, this study aims to provide meaningful implications regarding whether the recent changes in the KETS can promote more environmentally sound and active climate reduction practices in firms or not. Therefore, this study focuses on corporate practices and activities to reduce CO<sub>2</sub> emissions.

Cadez and Czerny (2016) categorize corporate climate strategies into three types: (1) internal carbon reduction (so-called scope 1 emissions), (2) external carbon reduction (so-called scope 2 and 3 emissions),<sup>1</sup> and (3) carbon compensation (See Table I), and provide examples of practices by category. First, internal carbon reduction means reducing emissions on-site by lowering emissions from fossil fuel consumption, reducing emissions from a process, and reducing product outputs. Within this category, there are various ways to reduce emissions from fossil fuel consumption, for example, switching to low-carbon fuels or increasing boiler efficiency. Process emissions can be reduced through changing input materials or the product mix. Reducing product outputs embraces reducing the output as well as discontinuing production or relocating the firm to another country where regulations are less strict. Second, external carbon reduction refers to activities that reduce CO<sub>2</sub> emissions outside of firms by replacing CO<sub>2</sub> or energy-intensive inputs with less intensive materials. In other words, this is a way to reduce emissions indirectly. Third, regarding carbon compensation, the firms use tradable permits purchased from a carbon market or credits achieved from an offset project, such as forestation projects. Unlike internal carbon reduction, external carbon reduction and carbon compensation do not involve any on-site reduction in firms’ facilities. Therefore,

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<sup>1</sup> The GHG Protocol classifies emissions into three ‘scopes’ as follows: 1) scope 1: direct GHG emissions by the liable entities; 2) indirect GHG emissions from consumption of purchased electricity, heat or steam, which are generated by other entities; 3) other indirect emissions which are not included in scope 2 (Greenhouse Gas Protocol, n.d.). Scope 1 and 2 emissions are subject to the KETS. Therefore, construction companies are not required to participate in the scheme since the majority of their emissions are generated from the subcontracting firms that own the heavy equipment.

internal carbon reduction practices are the most environmentally sound practices that firms can take.

Table I. Classification of Practices of Climate Strategies

<b>Categories</b>	<b>Sub-Categories</b>	<b>Practices</b>
<b>Internal Carbon Reduction</b>	<b>Combustion Emissions Reduction</b>	<ul style="list-style-type: none"> <li>▪ Fossil fuel switching</li> <li>▪ Boiler efficiency enhancement</li> <li>▪ Combined heat and power</li> <li>▪ Energy source switching</li> <li>▪ Carbon capture and storage</li> </ul>
	<b>Process Emissions Reduction</b>	<ul style="list-style-type: none"> <li>▪ Use of recycled materials</li> <li>▪ Materials substitution</li> <li>▪ Product changes</li> <li>▪ Product mix changes</li> <li>▪ End-use energy efficiency improvement</li> <li>▪ Process changes and optimizations</li> <li>▪ Implementation of best available technology</li> <li>▪ Control of non-CO<sub>2</sub> emissions</li> </ul>
	<b>Product Output Reduction</b>	<ul style="list-style-type: none"> <li>▪ Output reduction</li> <li>▪ Discontinuation of production</li> <li>▪ Relocation of firms to a different country</li> </ul>
<b>External Carbon Reduction</b>	<b>Supply Chain Emissions Reduction</b>	<ul style="list-style-type: none"> <li>▪ Use materials produced using less energy</li> </ul>
<b>Carbon Compensation</b>	<b>Offsetting and Balancing</b>	<ul style="list-style-type: none"> <li>▪ Purchase tradable carbon permits</li> <li>▪ Use or purchase credits achieved from offset projects</li> <li>▪ Government affairs and negotiations</li> </ul>

Source: Modified Figure 1 in Cadez and Czerny (2016).

Recently, corporations have conducted practices in response to climate change. Svenska Cellulosa Aktiebolaget (SCA), one of the leading forestry companies in the world, started monitoring and reporting its emissions in 1998. This company embraced the idea of the EU ETS and initiated climate strategies while most European paper and pulp companies were still reluctant to implement the EU ETS (Gulbrandsen and Stenqvist, 2013). Also, facing the introduction of the EU ETS, many major oil companies conducted climate strategies such as using or deploying renewables and biofuels (Cherry, Hovy, and McEvoy, 2014).

As Gulbrandsen and Stenqvist's (2013) study found, corporations take different climate strategies even under the same regulation. They analyzed the effect of the EU ETS on corporate climate strategies on two pulp and paper companies located in Sweden and Norway. Although both are progressive regarding climate strategies, the Swedish company conducted more innovative abatement practices than the Norwegian company did. In the following section, the factors that influence corporate climate strategies are surveyed.

## 2.2. Factors in Corporate Climate Strategies

Eikeland and Kkjaerseth (2013) studied the relevant literature and sorted out major factors that impact corporations' climate strategies. They discussed various factors such as "the specific history of each company, size of the resource base (e.g. capital and human resources), management capabilities and leadership, ownership, regulatory risk inherent in overall company business strategy, environmental reputation, and stakeholder influence" (33).

Depending upon the factors, companies can take reactive or proactive strategies in climate change mitigation. Companies with reactive strategies might take the following approaches: opposing climate regulations, not complying with the regulations, or responding only in a shortsighted manner even after the regulations are enacted. Companies that take proactive

strategies conduct practices beyond the requirements stipulated in regulations and contribute to long-term climate solutions. Therefore, these corporations are bringing innovations (Eikeland and Kkjaersth, 2013). The regulations or policy measures must be sufficient enough to prompt corporations to change their climate strategies from reactive ones to proactive ones.

Eikeland and Kkjaersth (2013) identified both company-internal (or company-specific) factors and company-external factors. First, company-internal factors are inherited features of a company such as its production technology, product mix, and markets. Company-internal factors particularly shed light on reactive practices. For example, suppose that a company is trade-dependent and has an energy/CO<sub>2</sub>-intensive process. Once the emission trading scheme is introduced, this particular company would be exposed to higher risk due to declining competitiveness in the international market. In this case, the company would rather take reactive practices, for example, lobbying the government to change the regulation so it would be less strict. The “dynamic capability” of managers also falls into this category. Dynamic capability means that the manager has considerable discretion in conducting practices. Therefore, firms with strong dynamic capability tend to have more proactive strategies. Viewing the regulation as a new market opportunity, the manager might decide to invest in low-carbon technologies rather than stick to the routine.

The corporation’ climate strategies are affected by environmental regulations. Additionally, “national contextual factors” and international climate regimes can affect corporate climate strategies. Regarding national contextual factors, the nationality of a company matters. For example, when a regulation is implemented, home-based companies would feel more responsibility. Circumstances such as public awareness of climate change can also affect the corporations’ climate strategies. For example, higher awareness and demand for mitigation among the public would result in more proactive strategies. International regimes can also be an important factor. The stability and rigidity of the international regimes would promote companies to conduct reduction practices. For example, if the climate regime is expected to be strengthened continuously, the company would take action to reduce its emissions, based on the expectation that domestic regulations will be adjusted to conform to changes in the international climate regime (Eikeland and Kkjaersth, 2013).

In sum, corporations with higher carbon-intensity, those dependent on production technology, product mix, and markets, or lower dynamic capability are more likely to take reactive climate strategies. More robust domestic climate regulation would lead to more proactive climate strategies by corporations. In addition, if international regimes are also robust and consistent, this would likewise promote proactive strategies. Proactive strategies, which would, in turn, bring about innovative practices beyond compliance with current regulations, could change the company-internal factors through investments in new technology and searching for new markets. In turn, these enhanced company-internal factors would be likely to support or promote future proactive strategies.

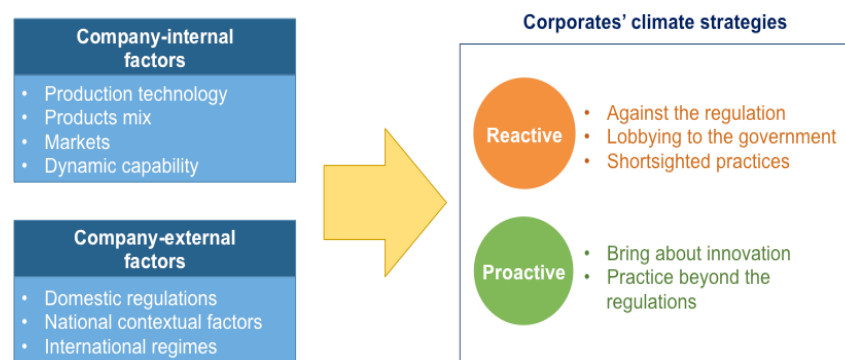


Figure I. Factors and Corporate Climate Strategies

Source: Built by the author based on Eikeland and Kkjaersth (2013).

### 2.3. Impacts of Regulations on Corporate Climate Strategies

There are various factors affecting corporates' climate strategies. As aforementioned, the aim of this study is to evaluate whether the recent changes in the KETS are appropriate to promote proactive climate strategies or eco-innovations of industries. Therefore, this study focuses on the regulation as a factor which impacts corporates' activities.

Unfortunately, due to the effects of other factors, it is difficult to know "the strength of the causal relationship" between a regulation such as an emission trading scheme and corporations' climate strategies. As aforementioned, while the internal factors – inherent features of companies such as production processes or technologies – influence strategy, changes in other policy instruments can affect them as well (Cherry et al., 2014). The case study that Gulbrandsen and Stenqvist study (2013) conducted proves this well. They attributed the reason why the climate strategies of SCA (a leading paper and pulp company in Sweden) are more proactive than the Norwegian company to internal factors. The Norwegian company was small-scale, and it recently closed mills.

A regulation was one of the significant drivers that resulted in eco-innovation (Hojnik and Ruzzier, 2016). Eco-innovation is a subset of innovation; therefore, the concept of eco-innovation is similar to that of innovation. According to Kemp and Pearson (2008: 7), eco-innovation is the "production, application or exploitation of a good, service, production process, organizational structure, or management or business method that is novel to the firm or user and which results, throughout its lifecycle, in a reduction of environmental risk, pollution, and the negative impacts of resources use compared to relevant alternatives." In addition, Horbach et al.'s (2012) definition of eco-innovation additionally included the significance of the contribution to the environment, which is not commonly found across studies. As Horbach (2016) articulated well, concepts of eco-innovation have some specific features related to 'environmental component' and 'fewer adverse effects on the environment and more efficient use of resources.' Therefore, the eco-innovation embraces the activities which are categorized in internal carbon reduction and external carbon reduction in Table I.

However, the impacts of climate regulations on corporate climate strategies are mixed. Cadez and Czerny (2016) concluded that the EU-ETS has limited effect on corporates. They attributed the results to "the overgenerous allocation, which provided little incentive to cut CO<sub>2</sub> emissions in phase I and II" (4140). Energy efficiency enhancement and process optimization were found to be the most widely used practices for climate change mitigation. Also, they found that the corporations did not use innovative practices, which need significant investment and are accompanied by significant business risks. In this reason, the authors argued: "that the current market, regulatory, and technology conditions do not yet provide sufficient incentives for radical innovation" (4140). Differently, Borghesi, Cainelli and Mazzanti (2015) concluded that effectiveness of EU-ETS in Italian manufacturing industries. In addition, Mo et al. (2016) concluded that Chinese ETS would promote investment in wind power.

The reason for the inconsistent implications of the environmental regulations on eco-innovation in industry sectors is an intervention of internal and external factors. The impacts of the EU ETS varied among different countries as different countries have "different priorities according to sector structures, energy intensities or environmental impacts" (Horbach, 2016: 2). Especially, environmental policy plays a more significant role in countries which are "predominantly locked-in in pollution-intensive technologies" (Horbach, 2016: 2). Manufacturing industry sectors account significantly for the South Korean economy, and the energy intensity in S. Korea (0.1695 MTOE/billion 2005 USD PPP) is relatively higher than the average value of energy intensities in OECD countries (0.1315 MTOE/billion 2005 USD PPP) (IEA 2015). Therefore, robust and well-designed regulation is more important in South Korea.

A consistent or stable regulation or policy can provide firms with clear expectations of the future regulatory environment. In turn, confidence in the regulatory environment will lead to increase in investment in eco-innovations by reducing the business risk (Brown, Angel, and Derr, 2000). In addition, the regulation needs to be strong enough to promote eco-innovations. The strong regulations can contribute to 'carbon leakage,' which describes the situation where corporates move to the countries with less stringent climate regulations. However, a positive effect of strong environmental regulations on economic growth is also pointed out. A strong

regulation or law can promote innovative activities in firms and, in turn, can contribute to growth (Azevedo et al., 2014).

### 3. KOREAN EMISSIONS TRADING SCHEME

#### 3.1. Brief Description of Korean Emissions Trading Scheme

On August 15, 2008, the 60<sup>th</sup> Anniversary of National Foundation Day, former South Korean President Lee Myung-bak announced Low Carbon/Green Growth (LCGG) as a new vision for national development for the next 50 years. This would reduce greenhouse gas (GHG) emissions and environmental pollution and create new jobs based on green technologies and clean energy. In the pursuit of the LCGG framework, the government established a mid-term national GHG emission reduction target of 30% by 2020 against the business as usual (BAU) levels (IEA, 2012).

To realize this vision, the government established a National Strategy for Green Growth in 2009, which outlined the specific goals and strategies for the Green Growth Paradigm. The Strategy has three goals: “(1) mitigating climate change and promoting energy dependence, (2) creating new engines for economic growth, and (3) improving the quality of life and enhancing Korea’s international standing” (IEA, 2012: 33).

The first goal consists of three agendas, one of which is “effective mitigation of GHG emissions” (IEA, 2012). To efficiently reduce GHG emissions, a cap-and-trade scheme that accounts for about 68% of total national GHG emissions commenced on January 1, 2015. According to the Act on the Allocation and Trading of Greenhouse Gas Emission Permits, 524 entities (as of June 9, 2016), totaling annual emissions exceeding 125,000 tCO<sub>2</sub>e, participated in the Korean Emissions Trading (KETS) in the first year.<sup>2</sup> These 524 liable entities are categorized into 23 industry sub-sectors.<sup>3</sup> Petrochemical companies (85) are the largest sub-sector, followed by paper and pulp (44) and waste (44). In the second year, 44 new entities entered into the KETS (GIR 2016).

Participating businesses have received Korean Allowance Units (KAU) for free. Although the proportion of the auctioned allowances is designed to increase in phase II and phase III, energy-intensive and trade-exposed (EITE) sectors will receive allowances for free through all phases. The allowances are allocated to the participating entities based on a benchmark estimated from their historical emissions from 2011 to 2013 (the base years) except for three sub-sectors: cement, oil refining, and aviation.

As aforementioned, the participating entities can comply with this program using various measures. If their carbon mitigation strategies are not a reduction of CO<sub>2</sub> emissions, but just compliance with the KETS by purchasing carbon permits, they can use permits including KAU (Korea Allowance Unit) and KCU (Korean Credit Unit). Similar to EAU (European Emission Allowance), the KAU is the official title of the carbon permits allocated and traded in the KETS, which is equivalent to the right to emit one ton of CO<sub>2</sub> emissions. The KCU means that the permit has been achieved from external emission reduction activities. However, in addition to KAU and KCU, a different type of carbon permit, KOC (Korean Offset Credit), is traded in the Korean carbon market. The KOC is a somewhat confusing term, but it means an amount of emissions reduced outside of installations. CERs (Certified Emission Reductions) achieved from the CDM (Clean Development Mechanism) project under the United Nations Framework Convention on Climate Change can be converted into KOCs. The KOCs started to be traded on May 23, 2016, according to the revision of the Regulation on the Management of the Carbon Permit Trading Market.

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<sup>2</sup> Currently, the Greenhouse Gas Inventory & Research Center of Korea (GIR) is verifying the permits that 522 business entities have surrendered for the first year. The number of participating companies has changed due to merger or division.

<sup>3</sup> These 23 sub-sectors are listed in Figure II.

In 2015, a total of 573 MtCO<sub>2</sub>eq was distributed to the liable entities. Figure II shows how KAUs are allocated by sector. There are five primary sectors: conversion, industry, building, transportation, and public waste. These five sectors are disaggregated more into 23 sub-sectors from energy generation to tap water. For example, 40 corporations and facilities are in the building sector, which also includes major university buildings. About 46% of the total allowances were allocated to the conversion sector, such as power plants. Fifty-one percent were allocated to the industry sector, and among the industry sub-sectors, the most allowances were allocated to steel corporations (19% of the total) followed by petrochemical corporations (9%), and cement companies (8%) (MOE, 2014).

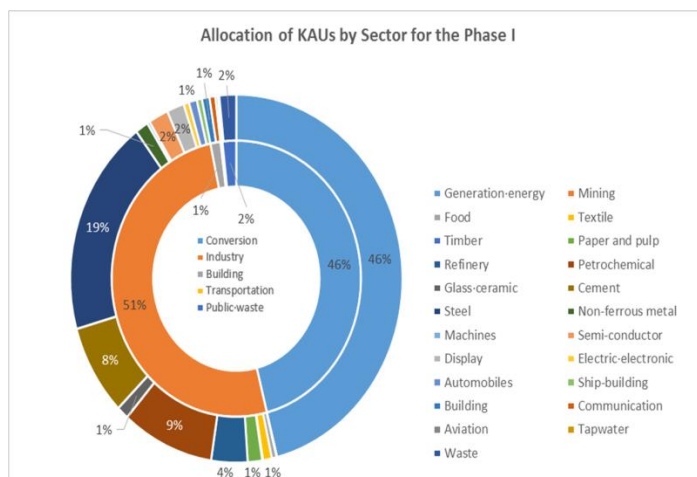


Figure II. Allocation of KAUs by Sector for Phase I

Source: The chart has been built by the author using a table in Nat. Permit Allocation Plan (MOE, 2014).

Table II. Summary of KETS

Types of ETS	Mandatory with Voluntary Opt-In
<b>Cap and Trajectory</b>	<ul style="list-style-type: none"> <li>Phase I (2015-2017): 1,687 MtCO<sub>2</sub>eq, including a reserve of 89MtCO<sub>2</sub>eq for market stabilization measures, early actions and new entrants (2015: 573 Mt CO<sub>2</sub>e; 2016: 562 MtCO<sub>2</sub>eq; 2017: 551 MtCO<sub>2</sub>eq)</li> <li>Caps for phase II and III have not yet been announced.</li> </ul>
<b>Emissions Covered</b>	0.677
<b>GHG Covered</b>	Kyoto six gasses (CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O, PFCs, HFCs, SF <sub>6</sub> )
<b>Sectors Covered and Thresholds</b>	<ul style="list-style-type: none"> <li>Phase one (2015-2017): 23 sectors</li> <li>Inclusion thresholds: company &gt; 125,000tCO<sub>2</sub>/yr, facility &gt; 25,000 tCO<sub>2</sub>/yr</li> </ul>
<b>Number of Liable Entities</b>	524 business entities including five domestic airlines
<b>Point of Regulation</b>	Downstream
<b>Compliance Period</b>	One year



<b>Trading Period</b>	<ul style="list-style-type: none"> <li>▪ Phase one: three years (2015-2017)</li> <li>▪ Phase two: three years (2018-2020)</li> <li>▪ Phase three: five years (2021-2025)</li> </ul>
<b>Allocation</b>	<ul style="list-style-type: none"> <li>▪ Phase one (2015-2017): 100% free allocation <ul style="list-style-type: none"> <li>- Grandfathering allocation according to the average GHG emissions from 2011 to 2013.</li> <li>- Benchmarking allocation: Three sectors (cement, oil refining, aviation) according to benchmarks based on data from 2011 to 2013.</li> <li>- 5% of total allowances are retained in a reserve for market stabilization measures (14 MtCO<sub>2</sub>eq), early action (41 MtCO<sub>2</sub>eq), and other purposes such as new entrants (33MtCO<sub>2</sub>eq)</li> </ul> </li> <li>▪ Phase two (2018-2020): 97% free allowances, 3% auctioned.</li> <li>▪ Phase three (2021-2025): less than 90% free allowances, more than 10% auctioned.</li> <li>▪ Energy-intensive and trade-exposed (EITE) sectors will receive 100% of their allowances for free in all phases. <ul style="list-style-type: none"> <li>- EITE sectors are defined along the following criteria: <ol style="list-style-type: none"> <li>1. additional production cost of &gt; 5% and trade intensity of &gt; 10%; or</li> <li>2. additional production cost of &gt; 30%; or</li> <li>3. trade intensity of &gt; 30%</li> </ol> </li> </ul> </li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>▪ Banking and borrowing <ul style="list-style-type: none"> <li>- Banking is allowed without any restrictions. Borrowing is allowed only within a single trading phase (maximum of 10% of entity's obligation, but exceptionally 20% for the first period), not across phases.</li> </ul> </li> <li>▪ Use of offset credits <ul style="list-style-type: none"> <li>- The share of KAU is limited to 10% of entity's obligation (maximum 5% of international offset credits)</li> </ul> </li> <li>▪ Market stabilization <ul style="list-style-type: none"> <li>- Allocate allowances from the reserve (up to 25% of the reserve)</li> <li>- Establish limit to the retention of allowances (minimum: 70% of entity's obligation and maximum: 150% of entity's obligation)</li> <li>- Increase or decrease the borrowing limit</li> <li>- Increase or decrease the offset limit</li> <li>- Set up temporarily the price ceiling or price floor</li> <li>- Conduct market stabilization measures in following cases <ol style="list-style-type: none"> <li>1. The market allowance price of six consecutive months is at least three times higher than the average price of the two previous years.</li> <li>2. The market allowance price of the last month is at least twice the average price of two previous years and the average trading volume of the last month is at least twice the volume of the same month of the two previous years.</li> <li>3. The average market allowance price of a given month is smaller than 40% of the average price of the two previous years. In 2015 and 2016, the price threshold is KRW 10,000.</li> </ol> </li> </ul> </li> </ul>
<b>Compliance</b>	<ul style="list-style-type: none"> <li>▪ The penalty shall not exceed three times the average market price of allowances of the given compliance year, or KRW 100,000/ton</li> </ul>

Source: ICAP (2016) modified and updated by the author.

Firms are allowed to comply with the KETS using KCUs for 10% of their emissions. The firms can use their allowances for the next year to meet their obligations for up to 20% of their emissions.

### 3.2. KETS Practice in Its First Year and a Half

From the opening of the Korean carbon market on January 12, 2015, to June 30, 2016, the total amount of permits traded were 4,268,489 tons of CO<sub>2</sub> and the traded value was equivalent to 67.74 billion KRW (59.84 million USD). The proportion of the traded amount to the total allocated allowances was only 0.8%. Also, KCUs account for 62% of the total amount of the traded permits, while KAUs contributed the other 38%. In addition to KCU and KAU, KOCs were also traded once on May 23, 2016, but the amount was minuscule at 2,413 tons. Since a very small amount of KAUs was traded for the first few days of the carbon market opening, as shown in Figures III and IV, the Korean carbon market has been described as latent. The price of KAU15 increased up to 21,000 KRW, as the due date for surrendering the permits approached. After the prices for KAU15 and KCU15 peaked, they have decreased. Currently (as of the end of July 2016), the permit prices are 17,000 KRW and 18,500 KRW for KAU16 and KCU16, respectively (Korean Exchange n.d.).

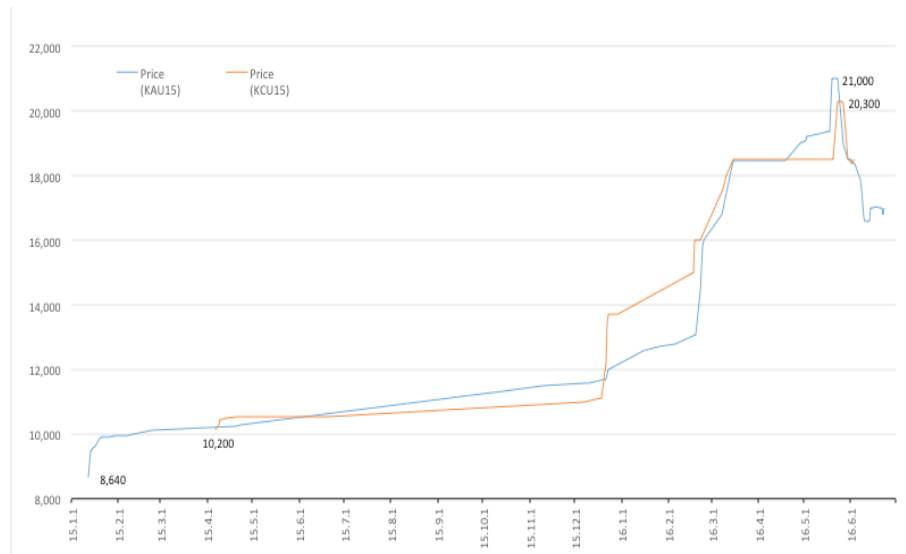


Figure III. Carbon Permit Prices for the Past One and Half Years (KRW/ton)

Source: This graph has been built by the author using daily KAU 15 and KCU 15 prices on KRX.

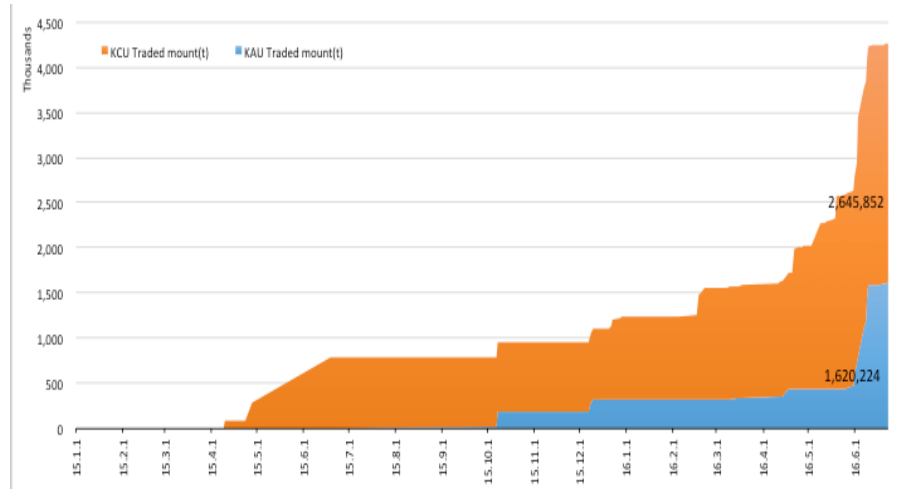


Figure IV. Carbon Permit Traded for the Past One and Half Years (tons)

Source: This graph has been built by the author using daily KAU 15 and KCU 15 prices on KRX.

Unfortunately, it is impossible to assess how each entity has met its obligation – by reducing on-site emissions, or purchasing permits, or borrowing their allowances – since the surrendered permits are currently being verified by the third party (Interview with a GIR staff member on July 20, 2016). Therefore, this study is trying to discuss overall compliance status using government documents. In 2015, a surplus of carbon permits for 2015 was built up. While the actual emissions of the liable entities are 543 MtCO<sub>2</sub>eq, they hold 550 MtCO<sub>2</sub>eq. About 45% of the participants appeared to have a shortage of permits equivalent to 13MtCO<sub>2</sub>eq. In contrast, the rest of them hold permits of 20Mt more than their actual emissions (Office for Government Policy Coordination, 2016). Some experts attribute this permit surplus situation to the recent economic depression in South Korea.

The entities that have experienced a shortage of permits can purchase them from the carbon market or borrow their allowances from the next year. In contrast, the entities for which the number of permits exceeds their actual emissions for 2015 can sell the surplus to the carbon market or bank the extra permits for next year. However, according to the Office for Government Policy Coordination (2016), it is anticipated that the entities with a surplus will deposit the extra permits for the next year. Therefore, the entities with a shortage will have difficulty purchasing permits from the market.

### 3.3. Recent Changes in the KETS and Relevant Climate Policies

In this section, recent changes in the KETS and the related climate policies in Korea are surveyed. In the following section, these changes are evaluated from the perspective of whether the changes are suitable for steering climate strategies of corporates in an appropriate direction.

#### 3.3.1. Changes in the Enforcement Decree of the Framework Act of Low Carbon Green Growth

Recent changes in the Enforcement Decree of the Framework Act of Low Carbon Green Growth are as follows. In line with the decision of COP21, held in Paris at the end of 2015, the

long-term GHG reduction goal, reducing GHG emissions by 30% by 2020 compared to the BAU levels, was updated to the INDC reduction target that the Korean government submitted to the UNFCCC for COP21. Currently, South Korea’s climate change mitigation target is to reduce its emissions by 37% below the BAU levels by 2030 (The amendment of Article 25(1); Office for Government Policy Coordination, 2016).

Also, the role of the Ministry of Environment (MOE) was reduced from comprehensive activities, including overall control and coordination regarding the establishment and management of the GHG reduction targets, to activities including overall control and coordination regarding management of the GHG reduction targets (The amendment of Article 26(1)). The GIR was under the jurisdiction of the MOE, but the GIR was changed to be affiliated with the Cabinet Office (The amendment of Article 36(1); Office for Government Policy Coordination, 2016).

Table III. Recent Changes in the KETS

	<i>Previous</i>	<i>Current</i>
<b>Climate Mitigation Policy Control and Coordination</b>	MOE	<ul style="list-style-type: none"> <li>▪ Comprehensive participating system</li> <li>▪ The Cabinet Office manages the overall policies</li> <li>▪ the relevant ministries enforce of the target</li> </ul>
<b>KETS Enforcement</b>	The control of the MOSF / The enforcement of MOE	<ul style="list-style-type: none"> <li>▪ The strengthened control of the MOSF</li> <li>▪ Four relevant ministries enforce the Ko-ETS</li> </ul>

Source: Modified by the author using the table from MOSF (2016).

Although more provisions of the Enforcement Decree were revised, those revisions are not discussed in this paper since this paper only focuses on the KETS.

### 3.3.2. Changes in the Enforcement Decree of the Act on the Allocation and Trading of Greenhouse Gas Emission Permits

As of June 1, 2016, the Enforcement Decree of the Act on the Allocation and Trading of Greenhouse Gas Emission Permits has been revised. Previously, the MOE had exclusive responsibility for the KETS. Under the amendment, the KETS is controlled by MOSF. The MOSF establishes the allowance allocation plan in line with the GHG reduction target stipulated in the Framework Act of Low Carbon Green Growth (The amendment of Article 3; Office for Government Policy Coordination, 2016).

Also, the MOE together with other relevant ministries (Ministry of Agriculture, Food, and Rural Affairs (MAFRA); Ministry of Trade, Industry, and Energy (MOTIE); Ministry of Environment (MOE), and Ministry of Land, Infrastructure, and Transport (MOLIT)) are enforcing the KETS. Previously, the MOE enforced the KETS across all the liable entities regardless of sector. After the amendment, the relevant ministries shall take care of the tasks related to the implementation of the KETS by responsible entities in each sector, such as the designation of the participating entities, the allocation of allowances, and the adjustment or cancellation of allocated allowances. (The amendment of Article 6). For example, the MAFRA is responsible for the enforcement of KETS among the liable entities in the agriculture, forestry, and farming industries (Office for Government Policy Coordination 2016).<sup>4</sup>

<sup>4</sup> The MOTIE, the MOE, and the MOLIT are responsible for enforcement in the industries and generating

In addition, a new provision was added to the Enforcement Decree of the Act on the Allocation and Trading Greenhouse Gas Emission Permits to provide incentives for participants to use energy-efficient technologies. Article 12(2) stipulates the criteria for allocating allowances. According to the recent revision, the contribution to the reduction of GHG emissions by integrated energy companies will be considered, allocating permits to each business entity (Office for Government Policy Coordination, 2016).

Allocation of allowances to the early reduction actions was planned in 2017. It has been moved up to 2016 (Office for Government Policy Coordination, 2016).

Given the current inactive status of the Korean carbon market as aforementioned, entities will be allowed to use 20% of their allowances for the subsequent year to meet their requirements. Before this amendment, companies could use 10% of their allowances for the following year to meet their requirements. In addition, the reserve will be provided to the carbon market (Office for Government Policy Coordination, 2016).

#### 4. ASSESSMENT OF ONE YEAR EXPERIENCE OF EMISSIONS TRADING SCHEME IN SOUTH KOREA

Vice-minister Choi of the MOSF emphasized that the success of the KETS would depend on corporate innovation during a site visit to Samsung Display in June 2016 (MOSF, 2016). Other high-level government officials also perceive the importance of corporate innovation. In this section, this study evaluates the recent changes in the KETS and relevant climate policies from the perspective of the corporations' climate strategies to see whether those changes can positively influence corporate activities in South Korea.

Regulations or policy measures are needed to promote corporations to change their climate strategies from reactive ones to proactive ones. Unlike command-and-control where the government tells the emitters how to do reduction activities, the emission trading scheme has been introduced to increase cost-effectiveness and to prompt business entities to conduct their CO<sub>2</sub> reduction practices. However, recent changes in the KETS and related policies are not enough to guarantee more proactive climate practices or eco-innovations among energy-intensive firms.

Allowing the firms to use more allowances for subsequent years to meet their obligations is likely to delay proactive emission reduction practices. Also, due to this amendment, the firms are likely to conduct carbon-compensation strategies rather than to implement internal carbon reduction strategies. As the cap is continuously strengthened (approximately 2% per year during the first compliance period) (MOE, 2014), and the share of the auctioned allocation is planned to be raised (3% in phase 2 and more than 10% in phase 3); therefore, the permit price is expected to increase. If corporations continued carbon-compensation strategies, their reduction practices would become more expensive. Even if they started implementing internal mitigation strategies, their reluctance would increase the emission abatement cost. In addition, this delay in reduction activities would not guarantee environmental soundness in national climate mitigation. Notably, small and medium corporations were found to take more reactive approaches to the KETS, as they had a vague expectation that government intervention would decrease the permit price to 10,000 KRW or that the KETS would be weakened or abolished. Therefore, they use the allowances for the next year to comply with the scheme rather than to carry out internal or external GHG reduction projects to reduce their emissions (Song, 2016). However, their expectations are not compatible with recent trends for permit prices and the international climate regime.

Furthermore, the changes in KETS structure – such as devolving the power to control and manage the KETS from the MOE to the MOSF – make it industry-friendly from the perspective of the liable entities. Of course, the industries had raised concerns about the previous practices

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sector, waste sector, and buildings and transportation sector, respectively.

of the MOE that seemed to ask them to reduce CO<sub>2</sub> emissions unreasonably. (Oh and Shim, 2016). The KETS appeared to move away from accomplishing environmental soundness.

Not every institutional change related to the KETS is negative in the aspect of corporate climate strategies. The amendment to allocate more allowances to integrated energy companies considering contributing to CO<sub>2</sub> reduction would promote more integrated energy services in Korea. It is also compatible with one of the agendas of the second National Energy Basic Plan – establishment of a distributed generation system (MOTIE, 2014). Public conflicts related to the construction of energy infrastructure, for example, power transmission and distribution lines, have become significant issues in South Korea. Therefore, the second National Energy Basic Plan aims to promote the deployment of a distributed generation system, including an integrated energy system, such as combined heat and power plants.

## 5. CONCLUSION

This paper briefly states the limitations of the recent changes to the emissions trading scheme in South Korea from the perspective of corporations' climate strategies. Corporate climate strategies are affected by both internal and external factors. The inherent features of a company are difficult to change without external stimulus. Therefore, the government is asked to stimulate corporations to change their strategies from reactive ones to proactive ones. Still, their climate strategies continue to be reactive. Moreover, the recent changes are likely to fail to promote proactive climate strategies. Therefore, the changes do not guarantee the environmental soundness of the KETS.

This study sheds light on recent changes to the KETS and related climate response structure in South Korea. However, this study has some limitations. Actual data on how each liable business entity has complied with the KETS for the first year is required to provide more practical implications. More specifically, if a company met its obligation only with allocated allowances by reducing its emissions, or if a company used KCUs or purchased KAUs to meet the target, this needs to be surveyed and evaluated. However, the disclosure of this information would seem to be difficult because the industries are very sensitive to disclosure of their CO<sub>2</sub> emissions and energy consumptions to the public (interview with the government official at the MOSF on July 30, 2016). However, if the actual compliance of individual corporate with the KETS was evaluated, this will provide more practical implications of the effectiveness of the KETS on corporate climate strategies in Korea.

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