



LUND
UNIVERSITY

Emissions Trading Mechanism to Mitigate Climate Change?

A case study in the Korean Emissions Trading Scheme focusing on the political-economic context behind the implementation and the policy design of the scheme

Sejin Lee

Master of Science in Human Ecology
Human Ecology Division
Department of Human Geography
Faculty of Social Sciences

Course: HEKM51 Master's (Two Years) Thesis (30 credits)

Term: Spring 2019

Supervisor: Noura Alkhalili

Abstract

This thesis investigates the political-economic context that underlies the Korean Emissions Trading Scheme (KETS). The idea of trading carbon as a commodity in the carbon market has been embraced by many regions to reduce carbon emissions and to mitigate climate change. The government of South Korea has started to implement the emissions trading mechanism since 2015 to curtail the national greenhouse gas emissions and to keep pursuing economic growth at the same time. However, the national emissions of South Korea have been increasing in contrast to the anticipation of the government of South Korea. The unsuccessfulness of the KETS in reducing emissions induces the enquiry into the reason of the malfunction of the scheme. In this regard, the aim of this research is to reveal the relation between the political-economic context behind the KETS and the malfunction of the scheme in emissions curtailment by focusing on the process of the implementation and the policy design, such as emissions permit allocation system and flexibilities, of the scheme. The investigation has been carried out on the basis of a critique on green capitalism and carbon commodification to critically analyze and interpret the collected data. Through collecting and scrutinizing data from primary and secondary materials in the form of semi-structured interviews and the governmental documents of the KETS primarily, this research uncovers what political-context underlies and embedded in the KETS. In addition, this research reveals the connection between the political-economic context behind the process of designing the KETS and the outcome of emissions reduction.

Keywords: *Korean Emissions Trading Scheme, Green Capitalism, Carbon Commodification, Market-oriented Climate Policy, Market-based Mechanism, Business-as-usual, Nationally Determined Contribution, Emissions reduction.*

Acknowledgements

I would like to acknowledge the great people who have supported and advised me during the entire period of the master's programme. I would have not been able to finish this journey without them.

First and foremost, I would like to express my sincere gratitude to all my dearest friends who have been supportive and holding my hands. Many thanks for being there all the time for me.

I would like to thank my thesis supervisor, Noura Alkhalili, for steering me in the right direction and encouraging me throughout the process of this thesis.

Finally, I must express my profound gratitude to my beloved family and to my partner, Hampus, and his family for providing me with unfailing support and endless encouragement throughout my years of study. Thank you so much for your love and support.

List of Acronyms

BAU	Business as usual
CDM	Clean Development Mechanism
CER	Certified Emissions Reduction
ETS	Emissions Trading Scheme
EU ETS	European Union Emissions Trading Scheme
GHG	Greenhouse gases
INDC	Intended Nationally Determined Contribution
KCU	Korean Credit Unit
KETS	Korean Emissions Trading Scheme
NDC	Nationally Determined Contribution
TMS	Target Management System
TWC	Tradable White Certificate
UNFCCC	United Nations Framework Convention on Climate Change

Table of Contents

- 1. Introduction** 1
 - 1.1. Aim and purpose of the research 3
 - 1.2. Research questions..... 3
 - 1.3. Significance of the study..... 4
 - 1.4. Contribution to Human Ecology and to the intersection of culture, power, and sustainability 5
- 2. Background**..... 6
 - 2.1. The commencement of the KETS 6
 - 2.2. The structure of the KETS 6
- 3. Framework of study** 11
 - 3.1. Theoretical framework: Critiques on green capitalism..... 11
 - 3.2. Key concept: Commodification of carbon 13
 - 3.3. Literature review 15
 - 3.3.1. Previous and current research in the KETS 15
 - 3.3.2. Critiques on market-based climate policy and green capitalism 17
 - 3.3.3. Previous research in analyzing market-based environmental policies based on flexibilities and market behavior 19
- 4. Methodology and Research Design**..... 20
 - 4.1. Research methodology 20
 - 4.2. Case study 21
 - 4.3. Research strategies 22
 - 4.3.1. Data collection 22
 - 4.3.2. Document analysis..... 23
 - 4.3.3. Semi-structured interviews 23
 - 4.4. Limitations 24
- 5. Findings and Analysis** 25
 - 5.1. Political-economic context behind the implementation of the KETS 25
 - 5.2. Politics behind allocating emissions permits 26
 - 5.2.1. Conflicts and criticism on emissions permit allocation..... 27
 - 5.2.2. Problem of current emissions permit allocation system..... 34
 - 5.3. Politics behind determining flexibilities 35
 - 5.3.1. Conflicts and criticism on flexibilities..... 36
 - 5.3.2. Problem of utilizing flexibilities and the market behavior of industries 40
- 6. Discussion** 43
- 7. Conclusion**..... 51
- 8. Bibliography** 53
- 9. Appendix** 60
 - Appendix A: Document Analysis – The list of analyzed texts** 60
 - Appendix B: Interview guide** 61

List of Figures

Figure 2-1. The concept of the Korean Emissions Trading Scheme	8
Figure 2-2. Korean Emissions Trading Scheme timeline	8

List of Tables

Table 2-1. Specific contents of each phase under the Korean Emissions Trading Scheme	9-10
Table 5-1. Emissions permits allocation in Phase 1 and Phase 2 (the 5 biggest emitters)	28
Table 5-2. GHG emissions of each year	29
Table 5-3. Changes in the legislative bills of free allocation proportion of emissions allowances	31-32
Table 5-4. Changes in the legislative bills of additional allocation of emissions allowances	33-34
Table 5-5. Changes in the legislative bills of banking	36-37
Table 5-6. Changes in the legislative bills of borrowing	38
Table 5-7. Changes in the legislative bills of offset	39-40

1. Introduction

Climate change is one of the most urgent and destructive key challenges that human beings are facing now. Confronting the threat of climate change, many countries endeavor to reduce the emissions of greenhouse gases (GHG) to decelerate climate change by planning to consume fewer fossil fuels, focusing on inventing new less-carbon-dependent technologies, and increasing the usage proportion of renewable energies. In doing so, the idea of emissions trading mechanisms was introduced to the 1997 Kyoto Protocol as one of the methods to diminish GHG emissions as well as to maintain economic growth (Böhm et al., 2012, p.1620).

Emissions trading mechanism works as a market-based climate policy that the total number of GHG emissions allowances are regulated by each government of the countries that embraced emissions trading scheme (ETS) (Magdoff and Foster, 2011). Emissions permits are distributed to corporations that are obliged to ETS for free or through auctioning in carbon markets (Ibid.). Afterward, obliged corporations are allowed to trade their given emissions permits with the other firms in carbon markets (Ibid., p.117). This is called “cap-and-trade”. The corporations, which have emitted less than their emissions allowances, can sell them to the other companies that want to emit more than their emissions permits (Ibid.). In addition to trading emissions permits in carbon markets, the idea of carbon-offsetting was included to ETS to grant obliged firms to receive more emissions permits if they conduct emissions reduction activities outside of their countries (Ibid.).

Among abundant emissions trading schemes, the European Union emissions trading scheme (EU ETS) is the largest scheme in terms of including many countries and a lot of diverse industries within the scheme (Koch, 2012). The EU ETS has been implemented under the Kyoto Protocol that requires developed countries to commit themselves to reduce their GHG emissions in a cost-effective way (Kenis and Lievens, 2015; Leonardi, 2017; Vlachou and Pantelias, 2017a; Vlachou and Pantelias, 2017b). According to Hildingsson and Koch (2016), the EU ETS has been implemented due to the belief that the best solution for coping climate change cost-effectively is using market-oriented climate policy. However, there has been a lot of criticism – that sees emissions trading and carbon markets are failures – arisen on the EU ETS (Hildingsson and Koch, 2016). Magdoff and Foster (2011) and Koch (2012) highlight that the emissions trading system must have given positive influences on the environment by

stimulating obliged sectors under the EU ETS to invest for green technologies and to transit their fossil fuel usage to no emitting GHG behavior. Notwithstanding, the EU ETS has not achieved a huge range of emissions reduction (Magdoff and Foster, 2011; Vlachou and Pantelias, 2017a). Rather than that, the EU ETS has resulted in some obliged corporations to have a lot of financial profits by trading an immense amount of emissions allowances in the carbon market (Ibid.).

Although there have been numerous criticisms on the EU ETS, the government of South Korea started to discuss the application of ETS as one of the main climate policies of the country in 2010. After having criticisms and conflicts among the stakeholders, the Korean Emissions Trading Scheme (KETS) has been implemented to reduce the national GHG emissions and to keep pursuing economic growth since 2015. However, the effectiveness of the KETS in reducing the national GHG emanations is debatable. After the KETS has been implemented, there have been a few research on the actual effectiveness of the KETS (Kim, 2018; Kim et al., 2018; Lee et al, 2017; Yu et al., 2017). According to those previously conducted research, the government of South Korea has not been able to curtail its national GHG emanations promptly by utilizing the KETS (Kim, 2018; Kim et al., 2018; Lee et al, 2017; Yu et al., 2017). Not only the research mentioned above, but numerous South Korean environmental organizations and research institutes (Energy and Climate Policy Research Institute, 2018; Green Korea, 2014) analyze that the KETS has not contributed to curtailing GHG emissions. According to the National Index System (2018), the national GHG emissions of a year has kept increasing although the KETS started to be applied since 2015.

Given that the KETS has been unsuccessful in terms of cutting back the GHG emissions of the country, it is important to figure out why the KETS has been malfunctioning and what is the reason for that. There has been some research in scrutinizing the effectiveness of the KETS by using statistical analysis (Kim et al., 2018; Lee et al, 2017; Yu et al., 2017), but those research are not able to explain the reason of the unsuccessful outcome of the KETS. In this sense, this thesis concentrates on the reason of malfunction by examining the political-economic context that was underlying the KETS. To date, scant attention has been paid to analyze the underlying political-economic context of the KETS. Hereby, this study contributes to ascertaining in which context the KETS has begun to be implemented. In addition, this research focuses on figuring out the relation of the political-economic context behind the policy design with the malfunction of the KETS in reducing GHG emissions.

1.1. Aim and purpose of the research

The aim of this research is to reveal what political-economic context influenced the introduction and the policy design of the KETS. More specifically, this research aims to examine the reason why the KETS has been abortive in reducing GHG emissions by investigating the relationship between the underlying political-economic context and the adjustments in the policy design, such as emissions permit allocation and flexibilities. In addition, this research investigates the relation of the green capitalist approach with the KETS. In doing so, this research attempts to question the structure of the KETS and its logic – that is, economic growth must keep being pursued while maximizing the chance of decelerating climate change by reducing emissions.

The purpose of this research is to provide a critical analysis of the underlying political-economic context of the implementation and the policy design of the KETS. In addition, the research attempts to claim that the industries, that are obliged to the KETS, and the government of South Korea must surpass the green capitalist approach. The research connotes the argument that requires the government to reframe the current market-oriented climate policy and to consider other alternative climate policies for coping with the ecological crises that we are confronting at the moment.

1.2. Research questions

This research attempts to answer the following three research questions:

1. What is the underlying political-economic context of the implementation of the KETS?
2. How are the regulations of emissions permit allocation and flexibilities set by the different interests of stakeholders and how do the established regulations affect the outcome of the KETS in curtailing GHG emissions?
3. How is the green capitalist approach embedded in the implementation of the KETS and in the process of setting the regulations of emissions permit allocation and flexibilities and how does the green capitalist approach affect the malfunction of the KETS in reducing GHG emissions?

1.3. Significance of the study

This research is a case study, that reveals emissions trading systems malfunction to reduce GHG emissions, of the KETS. In this research, I scrutinize ‘why’ and ‘how’ the KETS has limitations with respect to contributing to reducing GHG emissions by focusing on the political-economic context that underlies the introduction and the policy design of the KETS rather than giving attention to the effectiveness of the KETS.

Considerable research attention on the KETS has been directed toward evaluating the result and the effectiveness of the scheme statistically (Kim, 2018; Kim et al., 2018; Lee et al., 2017; Yu et al., 2017). While there has been a large number of research focusing on the political-economic context of the EU ETS and other market-based climate policies (Bryant, 2018; Hildingsson and Koch, 2016; Kenis and Lievens, 2015; Koch, 2012; Leonardi, 2017; Magdoff and Foster, 2011; Paterson, 2011; Vlachou and Pantelias, 2017a; Vlachou and Pantelias, 2017b), there has been no existence of research that addresses the issue of political-economic context underlying the market-oriented mechanisms in South Korea. In addition, the political-economic research approach has not been utilized to interpret the outcome of the KETS.

In this sense, this research analyzes the KETS by taking theoretical interpretations – the green capitalist approach and the concept of commodifying carbon – that have revealed the reason why market-oriented emissions trading mechanisms are limited with respect to GHG emissions reduction. In addition to that, document analysis on a wide variety of governmental document and official records – that present the specific policy designs and statistics of the KETS – is utilized to demonstrate the argument of this research. The specific policy design, such as emissions permit allocation and flexibilities (e.g. banking, borrowing, offset), is the core of KETS and the research focuses on investigating the politics that have arisen around designing the policy. Interviews, that were conducted with a researcher working for a non-governmental environmental research organization and a researcher working for the Energy and Climate Policy Research Institute, are also utilized in this research to back up the main argument of the study.

There has been no research that examines ‘why’ and ‘how’ the KETS has been implemented by scrutinizing the political-economic background. Moreover, little research has been done on reporting ‘why’ the KETS has not been functioning well to achieve the nationally determined contribution (NDC) of South Korea. Further, to date, scant attention has been paid to figure

out why the market-based mechanisms, ETS in this context, has shown a huge limitation in regard to releasing way less GHG emissions in South Korea. Hence, this thesis seeks to provide alternative thoughts and to fill the missing gaps to question if the market-oriented climate policies could improve the current situation that human being is at stake due to climate change.

1.4. Contribution to Human Ecology and to the intersection of culture, power, and sustainability

Human ecology is defined as a field that focuses on the interactive relationships between the “human social system” and the environment (Marten, 2010, p.1). Marten (2010, p.1) described that the social system is a mixture of things related to people, such as “population”, the “psychology” and “social organization” that formulate the behavior of people. The environment has been affected by human activities that are driven by the social system, and people have been modifying the current ecosystems to make them fit into what they need (Ibid.). As a consequence, the ecosystems negatively affect the human social system in different ways than before and it results in a vicious circle that is hard to escape.

Concerning this, the anthropogenic climate change brings a colossal threat to the future of mankind and the environment. GHG emissions from human being have been pointed out as one of the main driving forces of anthropogenic climate change and they have terribly affected the current ecosystems. Therefore, it is absolutely crucial to reduce the usage of fossil fuels in many countries and to invent more effective and feasible emissions reduction policies at both the national and local level of each country. Numerous countries and regions have embraced and operated ETS as a method to reduce their GHG emanations. However, ETS has been criticized by many scholars (Böhm et al., 2012; Carton, 2017; Guttman, 2018; Hildingsson and Koch, 2016; Lohmann, 2008; Lohmann et al., 2006; Magdoff and Foster, 2011; Newell and Paterson, 2010; Paterson, 2011; Shapiro, 2019) for the reason that it is not contributing to decreasing GHG emissions but to reproducing the current capitalist and environment-exploiting facet. In this regard, this research project contributes to Human ecology in terms of doing research on if the KETS has been operated with regard to reducing the national GHG emissions of South Korea. In addition to that, this research contributes to figuring out the relation of the political-economic context behind the KETS with the failure of the scheme.

2. Background

2.1. The commencement of the KETS

Responding to the urgent call of international needs to reduce GHG emissions against climate change, the 17th president of South Korea (2008-2012), Myung-bak Lee, and the South Korean government attempted to introduce and to implement ETS in South Korea (Winchester and Reilly, 2018). According to the Kyoto Protocol, the countries that were included in Annex 1 were obliged to reduce their GHG emissions, but South Korea was not included in Annex 1 (Son, 2014). South Korea was considered as a developing country at the time, hence the country did not have the obligation to decrease its emissions of GHG (Ibid.). However, South Korea had been achieving expeditious economic growth over a few decades (OECD, 2018) and the country became the 7th largest CO₂ releasing nation in the world (IEA, 2018). CO₂ emissions of South Korea rapidly increased from 232 million ton CO₂eq in 1990 to 551 million ton CO₂eq in 2010 (IEA, 2018). Accordingly, South Korea was no longer exempted from taking the responsibility of reducing emissions.

Under this circumstance, the government of South Korea under Myung-bak Lee pushed ahead with the slogan “Low carbon and green growth” as the new vision for the country (Sonnenschein and Mundaca, 2016) to keep encouraging economic growth as well as focusing on decarbonization and low-carbon technologies. In this context, the KETS was discussed to be introduced in South Korea (Han and Yun, 2011) after the G20 Summit in Seoul in 2010 and the scheme started to be implemented in 2015.

2.2. The structure of the KETS

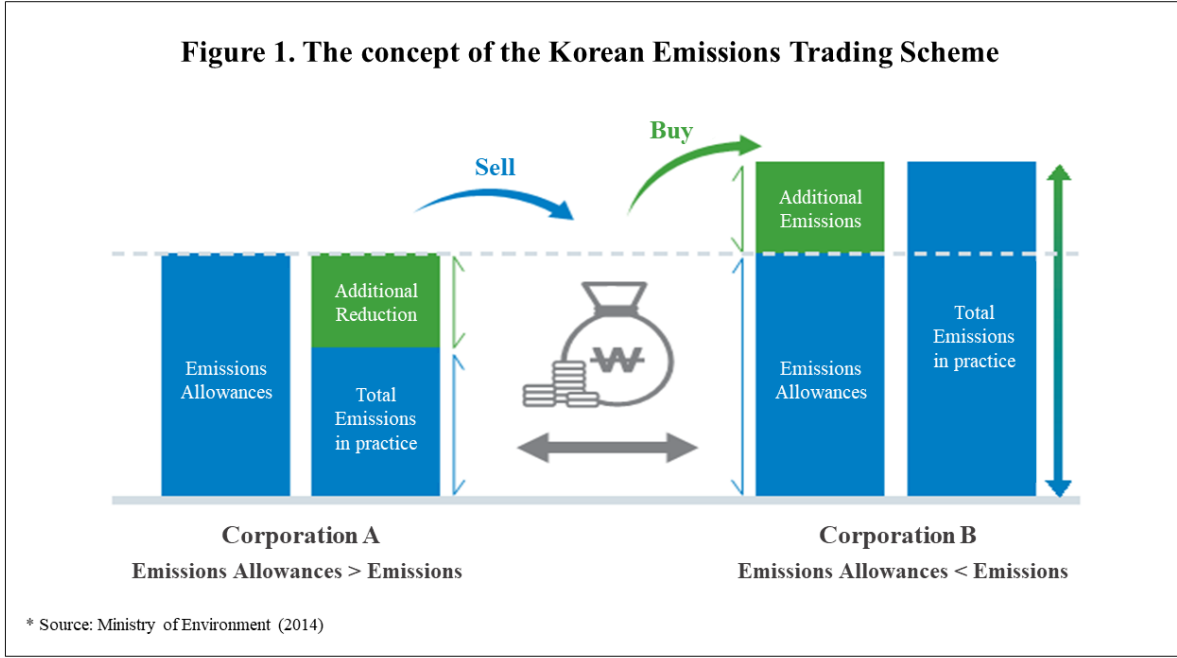
The emissions trading system of South Korea is one of the major climate policies to reduce GHG emissions at the national level. In 2014, the South Korean government made the decision to institute the market-oriented climate policy, which is the KETS, to diminish GHG emissions cost-effectively (Ministry of Economy and Finance, 2014). Moreover, the South Korean government expected the implementation of the KETS would entice the industries that were obliged to the scheme into investing more money to invent less carbon-dependent technologies (Ibid.). The government of South Korea envisaged that the implementation of the KETS would enhance the reputation of South Korea as a leading environmental country

that attempts to reduce GHG emissions although the country was not included in Annex 1 of the Kyoto Protocol (Ibid.).

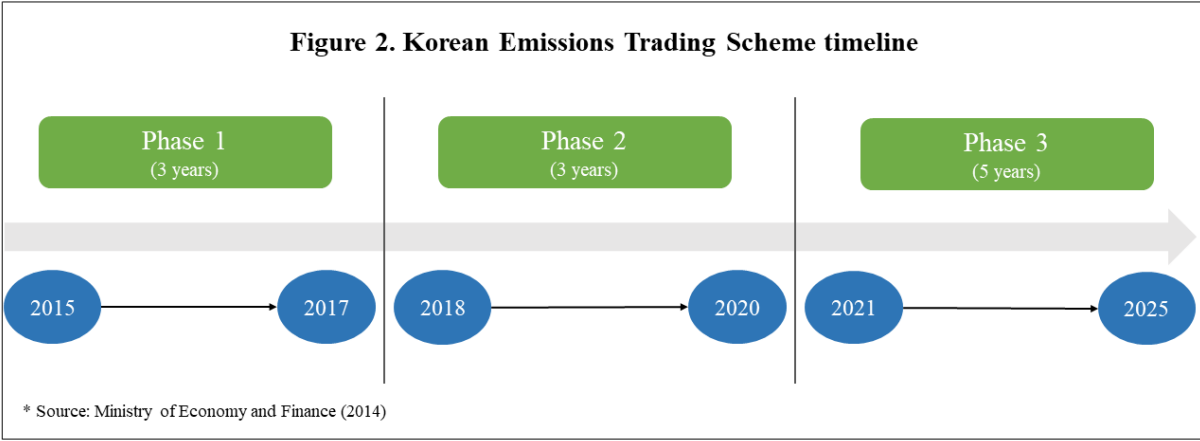
The emissions target of each compliance year and each compliance phase of the KETS is determined by the government of South Korea in accordance with the Korean national GHG emissions reduction roadmap (Ibid.). The first national emissions reduction roadmap was announced to the public in 2014 and the aim of the roadmap was curtailing GHG emissions by 30% compared to the business as usual (BAU) emissions of 2020 (Han and Yun, 2011; Ministry of Environment, 2014b; Sonnenschein and Mundaca, 2016). In 2016, the second national emissions reduction roadmap was launched after the 2015 Paris Agreement as the government of South Korea submitted its Intended Nationally Determined Contributions (INDC) to the United Nations Framework Convention on Climate Change (UNFCCC) (Ministry of Environment, 2015). Therefore, the national curtailment target was newly set to reduce GHG emissions by 37% compared to the BAU emissions of 2030 (Ministry of Environment, 2018a; Winchester and Reilly, 2018). In 2018, the amendment of the second national emissions reduction roadmap was announced, however, there was not an immense difference between the original version and the amendment. The amendment explained there would be more domestic reduction rather than overseas curtailment (Ministry of Environment, 2018a).

The government of South Korea decides which industries should be obliged to the KETS based on how much industries have emanated GHGs (Ministry of Economy and Finance, 2014). Then, the government of South Korea determines the amount of total distributable emissions allowances with regard to the national emissions target (Ibid.). Emissions allowances are ‘the right to pollute’ (Newell and Paterson, 2010, p.98) that are given to obliged corporations. The government of South Korea allocates emissions allowances to obliged industries and requires the industries to emanate GHGs less or equal to their given emissions permits (Ministry of Economy and Finance, 2014; Ministry of Environment, 2014b). As figure 1 illustrates, each obliged entity performs to curtail their GHG emissions autonomously or otherwise, the obligated corporations can sell their spare emissions allowances to the other firms and to buy additional emissions permits from the other firms (Ibid.). When an obliged entity wants to trade its emissions allowances, the company is able to merchandise and purchase emissions allowances in the carbon market. The carbon market is an emissions trading platform and it is operated by the Korea Exchange in South Korea (Kim et al., 2018, p.3). At the end of each compliance year, the government of South Korea

receives the specification of each corporation’s total GHG emissions (Ministry of Economy and Finance, 2014). If a company has released GHGs exceeding the given emissions allowances, the government imposes a penalty on the company (Ibid.).



As figure 2 illustrates, the KETS is divided into three phases: Phase 1 is from 2015 to 2017, Phase 2 is from 2018 to 2020, and Phase 3 is from 2021 to 2025. According to the Ministry of Economy and Finance (2014; 2017) of South Korea, the goal of each phase has been set differently and the specific contents – for instance, the way of allocating emissions allowances (e.g. grandfathering, benchmarking), the type of allocation (e.g. free allocation, auctioning), the rules of utilizing flexibilities (e.g. banking, borrowing, offset, market stability provisions), etc. – of each phase are also set diversely in accordance with the goal of each phase.



As Table 1 illustrates, the goals of the first phase were to expose obliged entities to the KETS and to settle the scheme down in South Korea successfully (Ministry of Economy and Finance, 2014; Ministry of Economy and Finance, 2017). The aim of Phase 1 was also operating the scheme pliantly to minimize the economic pressures for obliged entities (Ibid.). In addition to that, the entire emissions allowances of Phase 1 were allocated free of charge to obligated corporations (Ibid.). In doing so, it was anticipated that the awareness of obliged entities to the scheme would be raised and the implementation of the new market-oriented climate policy would be stabilized (Ibid.).

Meanwhile, as Table 1 presents, the aims of the second phase and the third phase are focused on diminishing GHG emissions ‘effectively’ (Ministry of Economy and Finance, 2014; Ministry of Economy and Finance, 2017). The targets of Phase 2 are curtailing a considerable amount of GHGs, applying the benchmarking allocating method to more obliged entities, and allocating the 97% of the total amount of emissions permits free of charge and auctioning the rest 3% (Ibid.). According to the governmental document of the Ministry of Economy and Finance (2017), it is expected to induce obliged corporations to improve the efficiency of their production facilities by expanding the application of the benchmarking allocation method. In addition, Phase 2 is aiming for inducing obliged enterprises to innovate less-carbon-dependent and environmental facilities by giving allocation incentives (Ministry of Economy and Finance, 2017). During the third phase, the main targets are reducing GHG emissions ‘effectively’, increasing the auctioning-allocation proportion more than 10% of the total amount of emissions allowances, and enabling the third party, such as brokerage companies, to participate in the carbon market (Ibid.). Thereby, the KETS is expected to be settled down and stabilized as a core policy to meet the 2030 GHG emissions reduction target¹ (Ibid.).

Table 1. Specific contents of each phase under the Korean Emissions Trading Scheme

	Phase 1 (2015-2017)	Phase 2 (2018-2020)	Phase 3 (2021-2025)
Aim	<ul style="list-style-type: none"> • Stabilization of the KETS • Flexible operation of the KETS • Accumulation of experience and infrastructure 	<ul style="list-style-type: none"> • Considerable GHG emissions curtailment • Increase efficiency in allocation 	<ul style="list-style-type: none"> • Massive GHG emissions curtailment • Enable the third party (e.g. brokerage companies) to

¹ Reducing GHG emissions by 37% compared to the BAU emissions of 2030.

		<ul style="list-style-type: none"> • Low-carbon innovation by giving allocation incentives 	<p>participate in the carbon market</p> <ul style="list-style-type: none"> • The KETS as the major method to achieve the 2030 emissions reduction target
<p>Cap (Each phase / Each year)</p>	<ul style="list-style-type: none"> • Total: 1,686,549,412 ton CO₂eq • Reserve: 88,821,664 ton CO₂eq (84.5% used) • Emissions permits: 1,597,727,748 ton CO₂eq • 2015: 543,227,433 ton CO₂eq • 2016: 532,595,917 ton CO₂eq • 2017: 521,924,398 ton CO₂eq (*changed to 538,931,293 ton CO₂eq) 	<ul style="list-style-type: none"> • Total: 1,796,133,000 ton CO₂eq • Reserve: 153,152,000 ton CO₂eq • Emissions Permits: 1,642,981,000 ton CO₂eq • 2018: 547,660,000 ton CO₂eq • 2019: 547,660,000 ton CO₂eq • 2020: 547,660,000 ton CO₂eq 	N/A
<p>Allocation method (Grandfathering / Benchmarking)</p>	<ul style="list-style-type: none"> • Mainly grandfathering • Benchmarking on 3 industries (oil refinery, cement, aviation) 	Expansion of benchmarking method	Settling down benchmarking method
<p>Allocation (Free allocation / Auctioning)</p>	100% Free allocation	<p>97% Free allocation 3% Auctioning</p> <p>*Companies that are highly trade-intensified and require high production expense can get 100% free allocation.</p>	<p>Less than 90% Free allocation More than 10% Auctioning</p> <p>*Companies that are highly trade-intensified and require high production expense can get 100% free allocation.</p>

* Source: ICAP (2019); Ministry of Economy and Finance (2017); Ministry of Economy and Finance (2014); National Law Information Center (2019)

As Table 1 presents, the way of allocating emissions rights is divided into two different methods: grandfathering and benchmarking. Grandfathering is “the view that prior emissions increase entitlements to future emissions” (Knight, 2013, p.410). In other words, it is the way to allocate emissions allowances to obliged companies based on their previous GHG emissions records (Knight, 2013; Ministry of Economy and Finance, 2017; Ministry of Environment, 2018a). Thereby, the corporations that released GHGs considerably in the past

get more emissions permits. In contrast, benchmarking is an allocation method that gives more emissions allowances to firms which emitted scant GHGs due to the efficiency of their production facilities (Ministry of Economy and Finance, 2017; Ministry of Environment, 2018b). The corporations, such as oil refinery, cement, and aviation, have been getting their emissions allowances based on benchmarking from Phase 1 and the rest firms have been obtaining allocations based on grandfathering (Ministry of Economy and Finance, 2017). Benchmarking allocation was supposed to be expanded to cover more sectors from 2018, however, it began in earnest in 2019 (Today Energy, 2019).

Lastly, flexibilities are one of the core elements of an emissions trading system. Flexibilities are set and operated for obliged sectors to achieve their targets cost-effectively (Mundaca et al., 2008; Richter and Mundaca, 2013) under market-oriented policies, such as ETS. Banking, borrowing, and offset are flexibilities of the KETS. Through banking, a company can move its unused emissions permits to the next compliance year if the company has emanated GHGs less than their given emissions permits. Through borrowing, a company can borrow the emissions permits of the next compliance year. Through offset, obliged corporations can exchange their credits from certified emissions reduction (CER) activities, such as Clean Development Mechanism (CDM) businesses conducted in the third world, with emissions allowances (Ministry of Economy and Finance, 2014; Ministry of Environment, 2014b).

3. Framework of study

3.1. Theoretical framework: Critiques on green capitalism

Green capitalism is defined as an approach that focuses on green growth as an opportunity not only to enhance the ability to protect the environment but also to make ‘profits’ by implementing new environmental technologies (Harris, 2014). In other words, green capitalism is an approach that considers market-oriented environmental solutions will be putting the broken environment in a better state (Rogers, 2010). The approach of green capitalism promotes the belief that if capital is invested in the right place, for example, inventing new environmental technologies, such as solar panel, wind energy plant, and electric cars, then this could resolve environmental problems (De Perthuis and Jouvét, 2015, p.96). In addition, the promoters of green capitalism believe that if the market is operated

transparently, then the market-based environmental solutions will bring benefits to the environment in the end (Rogers, 2010). The bottom line of green capitalist approach is that if green investment and the market work well, much profit through economic growth still be generated and also the environment will be maintained and preserved. In relation to the emergence of carbon markets and emissions trading systems, Newell and Paterson (2010) elucidates market-oriented climate policies, such as ETS, tend to be believed as the most appropriate political attempt to continue economic growth with decarbonizing and greening the global economy.

However, the green capitalist approach has a fundamental problem per se. Harris (2014, p.43) elucidates that green capitalism has been criticized by Marxist scholars and radical environmentalists. Marxist scholars castigate green capitalism for conforming to conventional capitalist systems which need “a constant expansion” of their markets (Ibid., p.43). If there is market expansion, there will be more consumption from the environment and more pollution as a result (Ibid.). Ironically, green capitalism promises to keep economic growth while using less from the ecosystem (Rogers, 2010). In addition, finding environmental crisis solutions in the innovation of technology, such as inventing new renewable energy sources, will not be able to be easily realized because the field is already “monopolized by a pre-existing technology, like fossil fuels” (Harris, 2014, p.44). Marxist scholars and radical environmentalists insist that environmental issues will not be solved by greening capitalism due to its fundamental negative facet of accumulation by production and pursuing profits (Ibid., p.43). Therefore, environmental crises will be exacerbated by embracing the green capitalist approach.

The idea of emissions trading is built on the green capitalist approach. Emissions trading is commodifying carbon and the other GHGs by selling and buying them in a form of emissions allowances (Shapiro, 2019). The governments under ETS believe in the positive function of the carbon market that corporations, which are obliged to ETS, will be able to reduce their GHG emissions while making profits through economic growth and investing their capital to find a way to them being less carbon-dependent.

However, carbon markets are gravely malfunctioning. Paterson (2011) points out that emissions trading mechanisms are dominantly believed to be an efficient method to reduce GHG emissions and to prevent the environment although emissions trading systems do not contribute to achieving either of them. Carbon markets have been created, maintained and

expanded by a political coalition which believes ETS will make the countries under the scheme achieve the emissions reduction targets (Paterson, 2011). In addition, carbon markets are considered as businesses that will stimulate investments and induce profits and economic growth at the same time (Ibid.). Hildingsson and Koch (2016, p.110) criticize the idea that commodifying carbon emissions permits and trading them as ‘private property rights’ of the obliged companies under the ETS in carbon markets are superior to regulating GHG emissions in practice. Therefore, the idea that leaving the GHG emitters in carbon markets and inducing them to trade ‘the right to pollute’ (Newell and Paterson, 2010, p.98) is not functioning in reducing emissions as it was believed to do by its adherents.

As Guttman (2018, p.94) criticizes, emissions trading is “a form of complacent green capitalism” indeed. Many governments and private corporations under ETS have not changed their dependency on fossil fuels consumption (Newell and Paterson, 2010). More importantly, the affluent companies afford to buy additional emissions allowances in carbon markets or get offset credits from their clean development businesses in the third world (Magdoff and Foster, 2011). Companies, that are obliged to ETS, invest their money for buying additional emissions permits not only for having more ‘right to pollute’ but also for making profits by selling them (Shapiro, 2019). Therefore, this illusionary green capitalist approach is condemned by many Marxist scholars and radical environmentalists for making contradictions in itself and not dismantling the ‘logic of capitalism’ (Lohmann et al., 2006, p.199).

In this sense, Lohmann (2008, p.364) insists that dismantling and reforming the conventional capitalist discourse in development and investment must be primarily coming to the realization. Lohmann (2008, p.364) also points out that regulating GHG emissions in carbon markets, without re-framing the market-based approaches, is not an “effective” approach to the challenge of climate change (Lohmann, 2008, p.364). Moreover, if the current market-oriented mechanisms continue, a justification that reinforces and maintain the discourse – that is, economic growth can be compatible with environmental preservation – will keep being promoted.

3.2. Key concept: Commodification of carbon

A commodity has value in itself so that it can be exchanged for something else and it can produce money by being traded in markets (Lohmann et al., 2006). In addition, a market is utilized as a place where the producers, sellers, and buyers of commodity build their

relationship by trading commodities (Castree, 2008). Under ETS, carbon per se is considered as a ‘tradable’ commodity and, therefore, private sectors, that are obliged to ETS, sell and buy carbon in carbon markets with the other obligated entities. In other words, the idea of trading emissions permits in carbon market converts carbon into a commodity that can be sold and bought by the parties under ETS (Newell and Paterson, 2010). This idea has been used as a way to reduce GHG emissions in order to mitigate climate change in many regions. However, the emissions trading idea induces a significant question: What are the underlying context and the implication of commodifying carbon?

Castree (2008, p.147) criticizes that the idea of solving environmental issues by leaving them in a free market is not the way to protect natural resources and ecosystems but it is the way to allow stakeholders (e.g. private firms) and arbiters (e.g. governments) to “privatize” and “marketize” the solutions to environmental problems. In doing so, governments and private sectors evade taking their immense and direct responsibility to environmental issues (Castree, 2008). Indeed, carbon commodities are forged by governments to impose restrictions on GHG emissions by distributing emissions permits to private firms (Lohmann, 2012; Lohmann et al., 2006). Carbon is privatized and marketized as a commodity in carbon markets so that it is traded in a form of ‘emissions allowances’ and ‘offset credits’, which is given to companies when they carry CER activities outside of their countries (Newell and Paterson, 2010). In the end, the governments and the private firms under ETS dodge the liability to cut GHG emissions down promptly, believing in the function – that is, the emissions will be gradually declined due to the price increase of emissions allowances (Shapiro, 2019) – of carbon markets.

Trading carbon as a commodity in carbon markets can be seen as a reasonable and successful strategy in terms of reducing GHG emissions ‘cost-effectively’ (Bryant, 2018). However, the way of doing this is to embrace a de facto capitalist legitimization and to create “accumulation opportunities” (Ibid, p.606). Stephan and Paterson (2012) investigate the underlying context of commodification of carbon and elucidate that the creation of carbon markets is the neoliberal ideology that advocates market-oriented solutions and refuses to give regulations on private companies. Therefore, carbon emissions permits turn into a property that could be traded in carbon markets and they have become commodities and properties of private firms that are damaging the climate (Newell and Paterson, 2010). Shapiro (2019) criticizes that this incomprehensible structure of carbon markets is the crucial means of setting the price on fossil fuels pollutant. Due to this reason, there has been no compelling development in the thoughts about climate change and has been no serious improvement in climate policies

(Newell and Paterson, 2010). The commodification of carbon and the creation of carbon markets have not been able to provide any momentous emissions reduction impact. On the contrary, they have been contributing the worldwide GHG emissions to grow (Newell and Paterson, 2010).

3.3. Literature review

In this section of the thesis, the literature review is divided into three parts and it analyzes the three different types of literature: the previous and current Korean research in the KETS, the previous studies in analyzing the ETS of different countries based on ‘flexibilities’, and the prior studies in finding a connection between green capitalism and carbon markets.

3.3.1. Previous and current research in the KETS

First of all, there are a handful number of current research in the KETS (Kim, 2018; Kim et al., 2018; Lee et al., 2017; Yu et al., 2017). Before the KETS was implemented (2011-2014), there were relatively numerous research in the topic and the majority of the research focused on assessing the expected policy design and effectiveness of the KETS through economic and administrative perspectives (Kim, 2012; Kim, 2013, Kim and Yoo, 2012; Kim et al., 2013; Lee and Lee, 2013; Lee, 2012; Lim et al., 2014). Little research has been done on scrutinizing the political-economic context underlying the policy design of the KETS and uncovering the conflicts that were developed during the formation of the KETS. In comparison, after the KETS was implemented, a few pieces of research evaluated the effectiveness and efficiency in terms of reducing GHG emissions during Phase 1 of the KETS. However, to date, scant attention has been paid to the KETS after the end of Phase 1, and more importantly, there is virtually no research evaluating and criticizing the KETS by utilizing the theoretical frame – criticizing the green capitalist approach and the commodification of Carbon. In this sense, this research will pose a new perspective in regard to appraising the KETS based on the specific rules of emissions permit allocation and flexibilities by interpreting with the theoretical frame.

After Phase 1 was terminated, there were a few numbers of research that scrutinized if the KETS had been effectively operated in terms of reducing GHG emissions during Phase 1 (Kim, 2018; Kim et al., 2018; Lee et al., 2017; Yu et al., 2017). Yu et al. (2017) evaluated the effectiveness of the KETS by analyzing the explanatory variables that could affect the GHG emissions reduction outcome (e.g. carbon intensity of obliged companies, average energy prices, the proportion of renewable energies, the energy intensity of obliged parties).

According to the research, the total amount of GHG emissions was narrowly reduced in 2015 after the steady increase in GHG emissions since 2007 (Yu et al., 2017). The average energy prices decreased in 2015 after the rapid ascent of the prices since 2011 and the proportion of renewable energies had increased since 2010 and it reached to 3% of the total number of diverse energy sources in 2015 (ibid.). Meanwhile, the carbon intensity of obliged companies had grown since 2010 (ibid.). In the empirical analysis section of the research, the result showed that the implementation of the KETS influenced some obliged companies (e.g. petrochemical industry) to reduce GHG emissions slightly, however, for some obligated firms, such as cement industry, power generation industry, and non-obligated parties, the KETS had not meaningfully influenced to entice the industries into reducing GHG emissions (ibid.). Yu et al. (2017) demonstrated the implementation of the KETS draw a consequence for the obliged parties to reduce GHG emissions narrowly in general. Nonetheless, the KETS failed to induce some obligated corporations to diminish their emissions. Despite the fact that this research has a limitation for the reason that it undertook research in assessing only the first compliance year of Phase 1. Notwithstanding, it is a consequential finding that the power generation industry had not been disturbed to decline their emissions by the application of the KETS on the grounds that the industry emanates the 34% of the total GHG emissions of South Korea (Kim, 2018).

In the meantime, Lee et al. (2017) analyzed the overall emissions reduction results and compared to what extent obliged industries decreased their emissions under the KETS which was started in 2015 with the GHG-energy target management system (TMS) which was started in 2012. Accordingly, the research insisted that there had been a small range of emissions reduction under the two emissions diminishment policies and it affirmatively expected that more emissions reduction would be accomplished in the power generation and the steel industry that comprises to the highest proportion of GHG emissions within industry section (Lee et al., 2017). However, given that this research only appraised the GHG emissions generated in the first compliance year of Phase 1, it is hard to meaningfully estimate that the KETS will be effective in regard to reducing emissions in the future. More importantly, taking only numbers and statistics into consideration has a limitation inside for the reason that the numbers do not consider the political-economic external factors behind the scene. For instance, Lee et al. (2017) stressed that there was a slight decrease in total GHG emissions in 2015 although the emissions kept increasing before the implementation of the

KETS. Therefore, Lee et al. (2017) concluded that obliged corporations had tried to diminish their GHG emissions in 2015.

Since the KETS has been implemented, the tendency of the research in relation to the KETS has been finding to what extent the KETS has been effective and efficient in terms of reducing GHG emissions. There has virtually been no research in analyzing the KETS with regard to the political-economic context underlying the policy design. In the meantime, Kim and Park (2012) scrutinized numerous social conflicts on the application of ETS in South Korea. The research explored two main social conflicts: conflicts around the institutionalization of carbon reduction policies (e.g. TMS, ETS, carbon tax) in South Korea and conflicts between industries and the environmental organizations on the legislation of the KETS (Kim and Park, 2012). Considering that the research was conducted before the KETS to be implemented, it has a limitation in respect of elucidating what political-economic conflicts were created by the stakeholders' interest after the implementation of the KETS. Although the research had found the abounding conflicts arisen by stakeholders during the legislation of the KETS, the research did not scrutinize why the conflicts were made and what political-economic context was behind the conflicts.

Aside from the research mentioned above, little research has been done on scrutinizing the political-economic context underlying the KETS although it has been 4 years since the KETS was started. To achieve the national goal of GHG emissions reduction, it is significant not only to analyze the effectiveness of the KETS but to comprehend how political-economic factors and interests of stakeholders have impinged on the policy design of the KETS.

3.3.2. Critiques on market-based climate policy and green capitalism

Over the years, an enormous amount of research has been carried out in an attempt to criticize market-based climate policies, such as emissions trading and carbon offsetting (Böhm et al., 2012; Carton, 2017; Guttman, 2018; Lohmann, 2008; Lohmann et al., 2006; Newell and Paterson, 2010). The purpose of emissions trading in carbon markets is to impose the costs of carbon emissions on the polluters – in this context, industries – by pricing carbon (Newell and Paterson, 2010). In doing so, emissions trading aims to reduce carbon emissions from industries by leaving the industries in carbon markets and making them trade their emissions allowances freely (Lohmann, 2008). However, Lohmann (2008) and Lohmann et al. (2006) bring up a question to the idea that carbon trading is an efficient way to achieve emissions reduction targets. Lohmann et al. (2006) point out that obliged companies that hold emissions

allowances are not interested in buying or selling their emissions permits in carbon markets but they just strive to not lose their economic profits due to releasing more emissions than their emissions allowances. Moreover, Lohmann (2008, p.361) stresses that emissions trading provides “financial incentives” to industries, such as electricity generators, aviation, oil, steel, cement, and chemicals, to postpone a drastic change in carbon emissions within the industries. Böhm et al. (2012, p.1632) insist that market-based climate policies are not making climate better by greening capitalism but they are “emerging politico-economic tools as part of a historically continuous process”. In other words, emissions trading is “a politico-economic tool” of climate capitalism (Böhm et al., 2012, p.1620). Böhm et al. (2012, p.1632) also highlight that trading carbon in carbon markets is “a trajectory of capitalist dynamics”. In addition, it changes the relationship between human being and natural environment in certain ways and causes inequality in many countries by commodifying carbon (Böhm et al., 2012).

In addition to the problems arisen within ETS, there are problems coming from the governments that are under ETS (Guttman, 2018; Lohmann et al., 2006; Newell and Paterson, 2010). Newell and Paterson (2010) insist that the governments restrict industries to reduce their emissions, but at the same time, they want to protect the industries in their countries to not get detriment of the business competitiveness in international markets. According to Lohmann et al. (2006), the governments that are highly dependent on corporations tend to allocate a lot of emissions permits to industries. For some governments, particular industries need to be protected to develop, therefore, the governments provide generous allocations to the industries (Newell and Paterson, 2010). In addition, many governments undertaking ETS issue emissions permits for free (Guttman, 2018). This undue generous allocation of emissions allowances does not encourage obliged companies to trade their emissions permits with the other companies and it ends up with low effectiveness in emissions reduction under ETS (Lohmann et al., 2006). Newell and Paterson (2010) criticize that the governments even have not ambitiously set their national emissions reduction target and they have not imposed on obliged industries to emit carbon way less. For instance, the European Union generously distributed emissions permits to industries during the first phase of the EU ETS and as a result, the companies did not experience scarcity in their emissions allowances (Newell and Paterson, 2010).

3.3.3. Previous research in analyzing market-based environmental policies based on flexibilities and market behavior

Flexibilities are set and operated for parties to achieve their targets cost-effectively under many market-based environmental policies (Mundaca et al., 2008; Richter and Mundaca, 2013). Obligated parties of market-based environmental policies, such as tradable green certificate scheme, ETS, and tradable white certificate (TWC) scheme², utilize “the given flexibilities to reduce compliance costs” (Mundaca, 2008, p.325). For instance, banking and borrowing are commonly known as flexibilities. Additionally, linking, offsets and longer compliance period are flexibilities in ETS (ICAP, 2017b). Mundaca et al. (2008) and Richter and Mundaca (2013) see flexibilities as an important thing that is connected to the market behavior of obliged parties under market-based environmental policies. In both two research, market behavior is developed as an analytical framework for understanding to what extent obliged companies have contributed to accomplishing their environmental targets by utilizing the flexibilities of market-based environmental policies (Mundaca et al., 2008; Richter and Mundaca, 2013). Through analyzing on market behavior based on the full set of existing flexibilities, Mundaca et al. (2008) examine if the TWC encouraged the obligated corporations to achieve their minimum energy savings in the UK and Italy. In doing so, Richter and Mundaca (2013) evaluate if the ETS encouraged the obliged parties to reduce their emissions in New Zealand. Both research present that the TWC of the UK and Italy and the ETS of New Zealand did not make large progress in meeting the mandatory energy saving targets of the UK and Italy and in reaching the emissions reduction target of New Zealand (Mundaca et al., 2008; Richter and Mundaca, 2013).

Flexibilities allow obliged firms to manage their emissions at the lowest cost to the economy under many market-based environmental policies (Mundaca et al., 2008; Richter and Mundaca, 2013). Considering the nature of a market economy, market behavior based on flexibilities play an important role in terms of vitalizing or inactivating carbon trading in the carbon market for achieving emissions reduction target under ETS (Richter and Mundaca,

² Tradable White Certificate (TWC) scheme is one of the market-based environmental policies. Under this scheme, energy producers, suppliers and distributors are imposed to take the responsibility of reducing energy consumption. Each obliged party of this scheme sets its energy usage target and it obtains tradable white certificates when it consumes less energy than its energy consumption target. Acquired tradable white certificates can be saved and utilized at another time when an obliged party does not meet its energy consumption goal. The certificates can also be sold to other obliged parties that are not able to meet their energy targets.

2013). For example, if some obliged enterprises decide rather saving their emission allowances to the following compliance period than trading their spare emission allowances in the carbon market. Thus, there will be a shortage of emissions permits. The shortage will cause an increase in carbon prices, therefore, it will make the obliged parties onerous to achieve their emissions reduction target. Indeed, market behavior driven by flexibilities is the core factor of ETS in terms of making the scheme work well to reduce emissions ultimately.

In this sense, this thesis examines how flexibilities of the KETS have been adjusted by the stakeholders and how the market behavior has been created due to the flexibilities of the KETS. In addition to that, this research scrutinizes how the green capitalist approach is embedded in the entire process of the KETS. A number of studies in South Korea looked into the effects of the KETS on emissions reduction and examined the effectiveness of the KETS by comparing the figure of GHG emissions of industries (Kim, 2018; Kim et al., 2018; Lee et al., 2017; Yu et al., 2017). However, there is a limited amount of research on finding the relation of the market behavior of the obliged parties with GHG emissions outcome. In this sense, this research investigates how the market behavior based on flexibilities affected GHG emissions outcome. In addition, it reveals the politics underlying the setting of flexibilities. Aside from flexibilities, the politics behind emissions allowances allocation is also examined in this thesis. The way of allocating emissions allowances, such as free allocation, auctioning, and additional allocation, is important to consider for the reason that it decides the burden of national emissions reduction target to obliged corporations (ICAP, 2017a). In other words, if emissions allowances are generously allocated to obliged parties, there will be less effort from the obliged parties to reduce their emissions actively.

4. Methodology and Research Design

4.1. Research methodology

In this research, I have taken a qualitative research approach as a methodology for the study. According to Creswell and Creswell (2018), a qualitative research approach is to scrutinize and to figure out how individuals understand a social problem through their experiences and social actions. Qualitative research allows enriching the level of details of data due to its exploratory nature. Therefore, it provides more insights into the topic, and more in-depth

understanding of the complexity of a situation to researchers during the examination of collected data. In this sense, this research approach fits the objective of this research in terms of unveiling the underlying political-economic context of the introduction and the policy design of the KETS and structuring valid arguments towards the scheme.

As taking a qualitative research approach in this thesis, the process of the research was proceeded in this order: recognizing the emerging problem, setting a hypothesis, collecting facts and data, analyzing and interpreting the meaning of the facts and data (Creswell and Creswell, 2018). In the case of this thesis, I recognized the unsuccessful outcome of the KETS in reducing GHG emissions and set a hypothesis that the political-economic context behind the KETS caused the outcome. Facts and data were collected through the governmental document and official records related to the KETS. In addition, semi-structured interviews were conducted in South Korea and secondary data, such as newspapers, publications of numerous non-governmental organizations, and research articles, were also collected. Analysis and interpretation were made based on the collected data. This research collected data focusing on the context behind the implementation of the KETS and the changes in the specific regulations of emissions permit allocations and flexibilities.

4.2. Case study

As a qualitative research approach, I have embraced a case study approach in this research. This research is a case study in the KETS focusing on the political-economic context behind the emissions permit allocation and flexibilities. According to Schramm (1971, p.6), the essence of a case study is to figure out “why” a decision was considered, “how” a decision was implemented, and “what” outcome has been generated through the implementation of a decision. To do this, a case study, firstly, “systematizes evidence so as to suggest hypotheses” and then, it unveils why and how a decision making is implemented by “providing a basis of fact and insight” of the event (Ibid., p.2). In addition to that, a case study scrutinizes the relation between a decision and “a large number of details” of the decision (Schramm, 1971, p.3). In a case study approach, details of a specific decision are significant to elucidate “what happened in the situation being studied” (Ibid.).

Yin (2014, p.35) elucidates that a case study approach is utilized when the research questions focus on figuring out “how or why some social phenomenon works”. Moreover, this approach is used when “a researcher has little or no control over behavioral events” and “the focus of the study is a contemporary phenomenon” (Ibid., p.32). In doing so, the researcher can

advance a thorough analysis of the case. Yin (2014) also points out the aspects of a good case study: when the case is unique and interesting to public and when the discussion of the study connotes theoretical and practical significance to the nation. In this context, a case study method fits for the case of the limitation of the KETS in reducing GHG emissions. Although the KETS has been implemented to curtail the national GHG emanations of South Korea, the scheme has not been able to contribute to reducing the national GHG emanations since 2015. There has been a number of research that concentrated on the effectiveness of the KETS (Kim et al., 2018; Lee et al., 2017; Yu et al., 2017), but little attention has been paid to the reason of the limitation of the scheme in reducing GHG emissions. Therefore, this issue needs to be thoroughly delved into in-depth by focusing on the political-economic context behind the emissions allowances allocation and the process of setting flexibilities. Through embracing this case study approach, I was able to advance a through analysis of the case of the KETS and to answer the research questions of this study.

4.3. Research strategies

4.3.1. Data collection

Data collection is a research method that allows researchers to understand the phenomenon, to answer the research questions and to evaluate outcomes by gathering information from various primary and secondary documents. In this research, governmental publications of the Ministry of Environment and the Ministry of Economy and Finance have been collected as primary data. In addition to the governmental documents, two individual depth interviews were conducted for collecting primary data.

For secondary data, publications of international organizations, publications non-governmental organizations in South Korea, publications of government-related research institute, private research data and publications, and online data, such as newspapers, were collected in this research. Publications of international organizations were released by Asian Development Bank (ADB), International Carbon Action Partnership (ICAP), and Organization for Economic Co-operation and Development (OECD). Publications of non-governmental organizations were provided by the Energy and Climate Policy Research Institute, the Federation of Korean Industries, the Future Strategy Institute of Korea Development Bank, Green Korea, etc. Publications of government-related research institute were provided by the Korea Energy Economics Institute.

4.3.2. Document analysis

As a research method, I have utilized document analysis in this research to investigate the collected data. Document analysis is an analytical method that reviews and evaluates documents for interpreting them to obtain more understanding in the documents (Bowen, 2009). In doing so, it enables to develop knowledge on a specific topic (Ibid.). The documents, that were collected as primary and secondary data during the data collection process, have been interpreted by using document analysis. As primary documents, the conducted interviews were transcribed and coded. Through analyzing the transcripts of the conducted interviews, I classified the data by themes: the political-economic context behind the implementation of the KETS, pros and cons of the policy design of the KETS, alternative climate policies, and the effectiveness of the KETS. In addition to the analysis of the interviews, the governmental documents of the Ministry of Economy and Finance, the Ministry of Environment, and the Ministry of Trade, Industry and Energy were analyzed in the research. The collected governmental documents provided official records and strategic plans of the KETS, the interim findings of the KETS, the changes in relation to the rules of emissions permit allocation and flexibilities, and the numbers of emissions allowances and the total amount of allowable GHG emanations. Through conducting an analysis of the transcripts of the conducted interviews and the governmental documents, I was able to find out what political-economic context has been underlying the process of the implementation of the KETS and also the adjustments of specific rules of allocation and flexibilities. As secondary data, publications of international organizations, publications of non-governmental organizations, publications of government-related research institute, private research data and publications, and online newspapers data were utilized to cover the shortage of governmental documents. Some publications of international organizations, such as ICAP, and online newspapers were able to cover the information deficiency of the governmental documents.

4.3.3. Semi-structured interviews

A semi-structured interview is implemented with numerous foreordained questions (Berg, 2001). At the same time, an interviewee is allowed to talk about other things that are still related to the subject but out of the prepared questions (Ibid.). In this research, semi-structured interviews were conducted for the reason that the research questions of this study were about scrutinizing the underlying political-economic context of the implementation and the specific regulations of the articles of the KETS. The respondents of the interviews were

asked the foreordained questions (see Appendix A) first and additional questions as well. Since this research has concentrated on understanding the thorough political-economic context behind the KETS, it was necessary to open the possibility to ask additional questions during the interviews to collect more in-depth knowledge and perceptions of the interviewees for better understanding on the research problem. The outcome of the interviews was analyzed and elaborated to back up the argument of this research.

During the field research in South Korea, I conducted two semi-structured interviews. The interviews were arranged in Korean and they were conducted as face-to-face interview. The entire conversation with the interviewees were recorded with approval of the respondents. The respondents of the undertaken interviews were a researcher of a non-governmental environmental research organization and the vice chief of the Energy and Climate Policy Research Institute. The respondent of a non-governmental environmental research organization required to keep the name of the interviewee and the information of the organization anonymously. Both researchers are experts in the KETS and have ample experience in researching and analyzing the KETS.

4.4. Limitations

The KETS is one of the major climate policies of South Korea. The specific regulations of the policy design have been changed and adjusted due to the strong demand of the industries that are obliged to the KETS. However, the government of South Korea did not give a press briefing on some adjustments. In addition, the competent authority is now unified, and the Ministry of Environment takes the full responsibility of the KETS. However, the authority to the KETS was divided into two and both the Ministry of Economy and Finance and the Ministry of Environment had the authority to the KETS. Consequently, it was difficult to follow some adjustments of the regulations of allocation and flexibilities of the KETS.

In addition, the GHG emissions data of each obliged sector of this year has not been opened to the public. Therefore, it was onerous to include the data of this year to analyze if the government is attempting to reduce the national GHG emanations rigorously through utilizing the KETS. Moreover, the records of GHG emanations and the reports of emissions permits trading activities of individual corporations have not been opened to the public. As a result, it was unable to scrutinize which specific industry has emanated GHGs to what extent and how much a specific industry has traded its emissions permits with the other corporations in the carbon market. Thus, it was demanding to investigate the market behavior of each entity.

Lastly, although I aimed to conduct more interviews than two, it was challenging to find respondents who were willing to be an interviewee for the research. The majority of the interview requests were rejected due to these reasons: the people explicitly mentioned that they were not interested in the KETS anymore and they had not been following the scheme for a long time after the scheme was started. In addition, a few interview requests were repudiated for security reasons. Therefore, it was not able to undertake more interviews with the expected respondents, such as governmental officials, professors of environmental studies of South Korean universities, environmental activists, and obliged corporations' staffs who are in charge of the KETS.

5. Findings and Analysis

5.1. Political-economic context behind the implementation of the KETS

The introduction of the KETS was discussed by the government of South Korea after the 2010 G20 Seoul summit from the 11th to the 12th of November. The pre-announcement of legislation of the KETS was declared on the 17th of November of that year. The vice chief of the Energy and Climate Policy Research Institute, Jung-Pil Lee, explained the reason behind the decision of introducing ETS to South Korea: “the reason was that the South Korean government at that time was attempting at branding the country as one of the leading green countries in terms of curtailing the national GHG emissions voluntarily against to climate change” (Lee, 19.03.2019). Lee and a researcher (from now on, researcher A) of a non-governmental environmental research organization analyzed: “being the chair nation of the G20 summit became a pressure to some extent to the government of South Korea” (Lee, 19.03.19; Researcher A, 13.03.19). Accordingly, the legislation of the KETS was discussed under the direction of Sang-hyup Kim of Green Growth Korea. The government of South Korea presented a “Low carbon and green growth” slogan and the emissions trading mechanism was chosen to be applied as one of the major climate policies. With regard to the political context, Lee said: “the ‘green growth’ frame within the KETS is erroneous for the reason that the ‘green growth’ frame put emphasis not on green but growth” (Lee, 19.03.19).

Researcher A added on its perspective on the political-economic context of the introduction of the scheme: “at that time, the South Korean government was considering starting the KETS

voluntarily to reduce the national GHG emissions before other developed countries forced emissions curtailment burden to South Korea. If South Korea became obliged to reduce GHG emissions by catering for the international criteria on emissions reduction target, the country could have not been able to set the own reduction target and control its own contents of GHG reduction policy design. Therefore, the government of South Korea made a decision to declare one step ahead to the international society that the country would willingly start decreasing the national GHG emanations on its own” (Researcher A, 13.03.19).

Both researcher A and Lee criticized that the specific contents of the KETS have been set and adjusted in favor of the perspective of the industries that are obliged to the KETS. In contrast to the government’s original plan for reducing GHG emissions, the government kept changing the specific rules of the KETS for accommodating obliged industries. Researcher A analyzed the situation: “the South Korean government had attempted to protect the interests of businesses. Therefore, there had been no revolutionary reduction in the national GHG emissions although the KETS was implemented” (Researcher A, 13.03.19). Indeed, obliged industries have been insisting that the national GHG emissions reduction target is excessively high to achieve and it would sabotage their business and economic growth of the country (Federation of Korean Industries, 2011; Federation of Korean Industries, 2014). To explain this situation, Lee pointed out: “the dominant political-economic context behind the KETS is that the government forms a carbon-intensive cartel with the industries” (Lee, 19.03.19). According to Ha and Byrne (2019), South Korea has been reliant on economic growth and collusive relations between the government and the businesses historically. Hence, the government has been adjusting the regulations of emissions permit allocation and flexibilities in favor of the industries.

5.2. Politics behind allocating emissions permits

Emissions permits are the right to pollute that are given to corporations, which are obliged to the KETS. Emissions permit allocation is one of the core contents of the KETS and it is important to allocate emissions permits well to increase the chance to reduce GHG emissions promptly. Therefore, it is significant to decide the total number of distributable emissions allowances appropriately and to determine the way of providing emissions permits to obliged corporations.

Although the significance of the policy design of emissions permit allocation to reduce GHG emissions effectively, there have been politics behind designing the specific elements of

emissions permits, such as BAU emissions reduction goal, grandfathering and benchmarking, free allocation and auctioning, and additional allocation. Therefore, the rules of emissions permit allocation have been adjusted to hardly achieve the nation's GHG reduction goal.

5.2.1. Conflicts and criticism on emissions permit allocation

- BAU emissions reduction goal

BAU emissions are the forecasted amount of GHG emissions of the future when a nation does not take any actions for reducing GHG emanations (Ministry of Environment, 2018a). BAU emissions reduction goal means the curtailment target compared to BAU emissions. The demerit of setting emissions reduction target based on BAU is that the target is not imperative. Therefore, the target can be adjusted for the reason that BAU is the foreseen GHG emissions of the future. However, to the government of South Korea, BAU emissions reduction goal is the criteria to decide the total allowable GHG emissions of a compliance year and a compliance phase of the KETS. BAU emissions reduction target is stipulated in the national GHG emissions reduction roadmap.³ According to the current national GHG emissions reduction roadmap⁴, the national curtailment target of South Korea is to reduce GHGs by 37% compared to BAU of 2030.⁵

As explained in section 5.1., emissions permits are allocated to obligated corporations based on the total amount of allowable GHG emissions of each compliance year and each phase (Ministry of Environment, 2014b). The total allowable GHG emissions of a compliance year are set by the national GHG emissions reduction roadmap. However, the national emissions reduction target based on the BAU emissions curtailment goal was changed in 2016 due to the release of the second GHG emissions reduction roadmap (see footnote 1 and 3). Accordingly, the total amount of allowable GHG emanations of 2017 were changed from 540,846,261 ton CO₂eq to 558,478,018 ton CO₂eq (Ministry of Trade, Industry and Energy, 2017). In

³ The national GHG emissions reduction roadmap is the pan-government administrative plan to accomplish the GHG emissions reduction target. As explained in section 2.2., the first national GHG emissions reduction roadmap was announced to the public in 2014 and the second national GHG emissions reduction roadmap was announced in 2016 after the 2015 Paris agreement. The amendment of the second roadmap was released in 2018.

⁴ In 2019, the current national GHG emissions reduction roadmap is the one established in 2016 and amended in 2018.

⁵ The first national GHG emissions reduction roadmap (2014) and the second national GHG emissions reduction roadmap (2016) set the curtailment target differently. As explained in section 2.2., the aim of the first roadmap was curtailing GHG emissions by 30% compared to BAU of 2020. The curtailment target of the second roadmap is curtailing GHG emissions by 37% compared to BAU of 2030.

addition, the total number of emissions allowances of 2017 was increased from 521,916,361 ton CO₂eq to 538,931,293 ton CO₂eq (Ibid.). In other words, due to the release of the second national GHG reduction roadmap, emissions allowances of 2017 were issued more.

Therefore, obliged companies received more emissions allowances in 2017 than they were originally supposed to obtain. Indeed, as Table 2 illustrates, each business received more emissions allowances after the redetermination in 2017. For example, energy and electricity businesses, that are the largest emitters in South Korea, were supposed to be given 240,378,507 ton CO₂eq of emissions allowances, but they received 246,941,227 ton CO₂eq of emissions permits.

Table 2. Emissions permits allocation in Phase 1 and Phase 2 (the 5 biggest emitters)

Unit: 1 ton CO₂eq = 1 KAU (Korean Allocation Unit)

Sector	Type of business	Phase 1				Phase 2
		2015	2016	2017	2017 (Amendment)	2018
Energy & Electricity	Energy & Electricity	250,189,874	245,284,190	240,378,507	246,941,227	263,451,000
Industry	Steel	103,959,878	101,921,450	99,883,021	100,771,923	88,195,000
	Petrochemical	48,857,291	47,899,305	46,941,318	47,909,090	49,421,000
	Cement	43,518,651	42,665,344	41,812,037	43,491,532	39,186,000
	Oil Refinery	19,513,420	18,777,862	18,402,305	18,618,476	16,891,000

* Source: Ministry of Environment (2018b), Ministry of Environment (2014) and Ministry of Trade, Industry and Energy (2017)

According to the Ministry of Environment (2014b), each obliged corporation should be given emissions permits less as years go by to achieve a gradual reduction in GHGs. In other words, emissions permits should be distributed less than the previous year (Ibid.). However, due to the change in the national reduction goal compared to BAU emissions (see footnote 3), obliged businesses achieved more emissions allowances in 2017 than in 2016 and they also received more permits in 2018 than in 2017 (see Table 1).

In this context, setting emissions reduction goals based on BAU has attracted criticism from the environmental activists and non-governmental environmental organizations in South Korea (Kim and Park, 2012; Energy and Climate Policy Research Institute, 2018). Jung-Pil Lee of the Energy and Climate Policy Research Institute mentioned during the interview: “the emissions reduction goal compared to BAU has been problematic for the reason that it does

not give an absolute quantity of must-be-reduced GHG emissions.” Kim and Park (2012) also point out that the BAU emissions reduction goal presents the perspective of the government of South Korea that economic growth is indispensable and accordingly, the increase of GHG emissions is inevitable. Hence, for the government, the emissions reduction target can be adjusted under the necessity of emitting more GHGs for economic growth (Ibid.).

The government of South Korea expected GHG emissions would be reduced to an immense extent after introducing the KETS (Ministry of Economy and Finance, 2014; Ministry of Environment, 2014b; Ministry of Environment, 2015). However, the entire amount of emanated GHGs has been increasing albeit the KETS has been implemented. As Table 3 delineates, GHG emissions have continuously escalated since 2014. The Energy and Climate Policy Research Institute (2018) and the other non-governmental environmental organizations, such as Greenpeace, Green Korea, Green Future, Korean Federation for Environmental Movement, etc., issued a joint-statement to castigate the government of South Korea and the allocation of emissions permits based on the BAU emissions target for being ambitionless and unrealistic to stop exacerbating climate change.

Table 3. GHG emissions of each year (2014-2017)

Unit: 1 million ton CO₂eq

	2014	2015	2016	2017
National GHG emissions target	659.1	637.8	621.2	614.3
Actual total GHG emissions	690.9	692.9	694.1	N/A

* Source: Ministry of Environment (2014) and National Index System (2018)

- Grandfathering and Benchmarking

As explained in section 2.2., there are two methods of allocating emissions permits: grandfathering and benchmarking. Grandfathering method is the way of allocating emissions allowances based on the previous GHG emanations of obliged corporations (Knight, 2013; Ministry of Economy and Finance, 2017; Ministry of Environment, 2018a; Ministry of Environment, 2018b). If an obliged company has emitted GHGs more than the others, it receives more permits than the other companies. In contrast, benchmarking method is the way of allocating emissions allowances based on the efficiency of obliged corporations’ facilities (Ministry of Economy and Finance, 2017; Ministry of Environment, 2018a). In other words, if an obligated firm has operated carbon-efficient facilities, it obtains more emissions permits

than the others for the reason that the firm has emitted GHGs less compared to the other companies.

Among the two emissions allocation methods, the grandfathering method has been utilized under the KETS. As Table 1 illustrates, the benchmarking method should have started to be actively used from the beginning of Phase 2. However, the government of South Korea postponed the application of the benchmarking method to the second compliance year of Phase 2. Instead, the grandfathering method has been applied and thereby, the biggest GHG emitters have received the majority of total emissions allowances of each phase (See Table 2). As Table 2 illustrates, the businesses that have received the largest number of emissions permits are energy and electricity corporations, steel, petrochemical, cement, and oil refinery corporations in regular sequence.

According to Kim and Park (2012), the biggest polluters have a tendency to prefer to receive emissions permits based on the grandfathering allocation method. In addition, obliged industries, in general, prefer the grandfathering method rather than benchmarking method. The vice chief of the Energy and Climate Policy Research Institute, Jung-Pil Lee, claimed: “the grandfathering allocation method has been creating the irony that the biggest polluters were allocated more emissions allowances than the other polluters” (Lee, 19.03.19). Lee also pointed out: “the collusive relations between the government of South Korea and businesses” (Lee, 19.03.19). According to Lee (19.03.19), the biggest polluters have both power and capital and South Korea relies on economic growth. In this context, the government cannot help but establish industries-friendly policies. Therefore, the grandfathering allocation method keeps being applied to the KETS to protect the right to pollute of obliged industries.

- Free allocation and Auctioning

Free allocation is the way of distributing emissions permits to obliged corporations free of charge. In comparison, auctioning is the way of making obliged corporations purchase emissions permits in the carbon market. Obligated corporations do not need to expend their money to obtain emissions allowances when free allocation is offered, but they have to spend their money to receive emissions permits through auctioning. As Table 4 illustrates, the government of South Korea had adjusted the proportion of free allocation of emissions allowances. In the pre-announcement of legislation (see the first cell of Table 4), the free allocation proportion was set to more than 90% of emissions permits for Phase 1. For Phase 3, the auctioning proportion was set to 100%. Starting from the pre-announcement of legislation,

the government had changed the proportion of free allocation and auctioning through each legislative bill. Accordingly, the proportion of free allocation for each phase had been increased. In the end, the enforcement decree of the act on the allocation and trading of greenhouse gas emissions permits was enacted in 2012 (see the fourth cell of Table 4). As Table 4 illustrates, the free allocation proportion of Phase 1 was set to 100% in the enforcement decree. For Phase 2, the free allocation proportion was set to 97% and the auctioning proportion was set to 3%. For Phase 3, the free allocation proportion was set to less than 90% and the auctioning proportion was set to more than 10%. Ever since the enforcement decree was enacted, the free allocation proportion of each phase has been maintained.

In addition to that, a condition was added to the act on the allocation and trading of greenhouse gas emissions permits in 2012 (see the third cell of Table 4). The condition allows a few obliged firms – that are ‘vulnerable’ to be economically affected by the national GHG emissions reduction target due to their high trade intensity rate and high rate of production expense – to be allocated emissions allowances free of charge no matter which compliance phase they are in (National Law Information Center, 2019). The Korean Federation for Environmental Movement (2012) and Kim and Park (2012) criticized that the condition was added to embrace the strong demand from obligated corporations and consequently, it would give an exemption to the firms from taking responsibility of emitting GHGs. The Korean Environmental Justice Institute (2012) also criticized the added condition that the majority of South Korean industries were trade-intensive, therefore, most of the obliged corporations would be able to get exempted from purchasing emissions permits.

Table 4. Changes in the legislative bills of free allocation proportion of emissions allowances

Pre-announcement of legislation (November 2010)	Government Amendment (April 2011)	Act on the allocation and trading of greenhouse gas emissions permits (May 2012)	Enforcement decree of the act on the allocation and trading of greenhouse gas emissions permits (July 2012)
Phase 1: More than 90% free allocation Phase 2: Depends on the enforcement decree Phase 3: 100% auctioning	Phase 1: More than 95% free allocation, less than 5% auctioning Phase 2: Depends on the enforcement decree	Phase 1: More than 95% free allocation, less than 5% auctioning Phase 2: More than 95% free allocation, less than 5%	Phase 1: 100% free allocation Phase 2: 97% free allocation, 3% auctioning Phase 3: Less than 90% free allocation,

	Phase 3: Depends on the enforcement decree	auctioning Phase 3: Depends on the enforcement decree *Based on trade intensity and production expense of each type of business, the corporations that are easy to be economically affected by GHG emissions reduction target will be allocated emissions permits free of charge	more than 10% auctioning *Based on trade intensity and carbon intensity of each type of business, the corporations that are easy to be economically affected by GHG emissions reduction target will be allocated emissions permits free of charge
--	---	---	--

* Source: Kim and Park (2012), p.262

In addition to the criticism, it has been contentious to determine the way of providing emissions allowances: free allocation or selling emissions permits through auctioning. Especially, distributing emissions allowances free of charge has been giving rise to conflicts between the corporations that are obliged to follow the KETS and the South Korean environmental organizations (Kim and Park, 2012). Obligated corporations have been requiring to be granted emissions allowances free of charge (Kim and Park, 2012; Korea Chamber of Commerce and Industry, 2012; Korea Economic Daily, 2018) for the reason that they pursue profits through their business as much as possible without expending money to purchasing emissions permits. Principally, the businesses that emanate GHGs the most – such as energy and electricity, steel, petrochemical, oil refinery, and cement – have been against to purchasing ‘the right to pollute’ (Kim and Park, 2012). Moreover, they have strongly claimed free emissions permit allocation. In opposition to obliged corporations, the environmental organizations postulate that free allocation gives a deferment of the obligation of GHG emissions reduction to obliged corporations (Green Korea, 2014; Korea Environmental Justice Institute, 2012; Korean Federation for Environmental Movement, 2012). Hence, the organizations have been demanding for more auctioning than the free allocation of emissions permits (Ibid.). Researcher A of a non-governmental research organization also said: “the proportion of auctioning is too low and due to this reason, it has not been able to reduce GHG emissions expeditiously. Obligated corporations do not attempt to reduce GHG emissions innovatively for the reason that they are mostly given emissions permits for free so they do not have to purchase emissions permits through auctioning and paying extra money. It is true

that the government of South Korea has been adjusting the proportion of free allocation higher to protect the interests of obliged corporations” (Researcher A, 13.03.19).

- Additional allocation

The article about additional allocation was not in the pre-announcement of legislation. It appeared in the government amendment and was finally established in the enforcement decree of the act on the allocation and trading greenhouse gas emissions permits in 2012 (see Table 5). According to the enforcement decree, the competent authority – which is the Ministry of Environment – shall be allocating additional allowances to an obliged corporation for a compliance year after the deliberation of the allocation decision committee. Less than 50% of the total increase in GHG emissions are counted to be given as additional allowances to an obliged company. Moreover, additional allowances are given to an obliged corporation only when the amount of GHG emissions of the company increases by more than 30% compared to the emissions permits that are allocated to a compliance year due to changes in production items, business plans, or production facilities.

According to Kim and Park (2012), the obliged industries required allocating additional allowances for 100% of the increase in their GHG emissions when they emitted GHGs more than 10% compared to their emissions permits of a compliance year due to changes in their business plans, production facilities, or production items. The environmental organizations in South Korea have not indicated any official stance on the added article about additional allowances.

Table 5. Changes in the legislative bills of additional allocation of emissions allowances

Pre-announcement of legislation (November 2010)	Government Amendment (April 2011)	Act on the allocation and trading of greenhouse gas emissions permits (May 2012)	Enforcement decree of the act on the allocation and trading of greenhouse gas emissions permits (July 2012)
N/A	Adjustment in allocation of emissions allowances Additional allocation of emissions permits will provide to the obliged corporations when they build or expand their	Adjustment in allocation of emissions allowances Additional allocation of emissions permits will provide to the obliged corporations when they build or expand their	Adjustment in allocation of emissions allowances When the amount of GHG emissions of an obliged company increases by more than 30% compared to the emissions permits that

	production facilities or when they change their business plans.	production facilities, when they change their production items or when they change their business plans.	are given to a compliance year due to changes in production items, business plans, or production facilities: the competent authority shall be allocating additional allowances – less than 50% of the increase in GHG emissions – to the obliged company for the compliance year after the deliberation of the allocation decision committee.
--	---	--	---

* Source: Kim and Park (2012), p.267

5.2.2. Problem of current emissions permit allocation system

In section 5.1.1., the adjustments to the emissions permit allocation system and the criticisms on the system are illustrated. The reduction target compared to BAU emissions has been utilized as the criteria of setting the total amount of emissions allowances and grandfathering allocation method has mostly been used to give more permits to corporations that have emanated GHGs more than the other companies. In addition, the free allocation proportion of each phase is fixed higher in the enforcement decree than the previous legislative bills and the auctioning proportion is appropriated preposterously low (see Table 4). Nevertheless, corporations insist that they will lose their market-competitiveness in international markets due to the regulations of the KETS (Federation of Korean industries, 2011; Kim and Park, 2012). In practice, however, all the adjustments to the emissions permit allocation system have been made by the government of South Korea to secure the interests of obliged companies.

The adjustments to the emissions permit allocation system have resulted in malfunctions in reducing GHG emissions through the KETS. First of all, setting the GHG emissions reduction target based on BAU emissions has not been effective in curtailing GHG emissions to an immense extent. The reason is that the BAU emanation reduction goal does not provide an absolute numerical value of the amount of must-be-curtailed GHG emissions. In addition to that, the goal based on BAU can be easily changed due to the reason, for instance, adjusting a new reduction target from the 2020 roadmap to the 2030 roadmap. It results in an increase in

the chance of emitting more GHGs by giving more emissions permits and time to obliged corporations. If the government of South Korea has had the will to cut emissions back expeditiously, it could have decided to set an absolute restricted quantity of GHGs that can be emitted. As Kim and Park (2012) pointed out, the BAU emissions reduction goal is the product of political compromise. In other words, the government of South Korea has compromised with the demand of industries that are obligated to the KETS and then have set the equivocal emissions reduction target to justify the necessity of economic growth.

Second of all, applying grandfathering as allocation method has been problematic in terms of allocating more emissions permits to the companies that have emitted GHGs more than the other firms. It is unfair that the corporations that have polluted the most get more permits and get exempted from taking their responsibility of reducing GHG emissions promptly. Further, it can be seen that the grandfathering method has been protecting the interests of obliged industries. Third of all, obliged companies have mostly been allocated emissions allowances without expending their money. It is because the proportion of free allocation is still high and the proportion of auctioning is absolutely low. Due to this reason, even the biggest polluters, such as energy and electricity, petrochemical, cement, steel, oil refinery industries, have been guaranteed to receive emissions permits free of charge. In doing so, obliged corporations do not have the burden of purchasing emissions permits in the carbon market through auctioning. They have kept emitting GHGs nearly as usual (Ministry of Economy and Finance, 2017). Although the government of South Korea declared that the proportion of free allocation would be ‘gradually’ decreased (Ministry of Economy and Finance, 2017), it is uncertain when the government will contribute to setting a revolutionary change in the emissions permit allocation system instead of favoring the interests of industries.

5.3. Politics behind determining flexibilities

Flexibilities are the core contents of the KETS and they are utilized as strategies of stabilizing the carbon market by influencing carbon price. In addition to that function, flexibilities are designed to lighten the economic burden of obliged corporations when they reduce their GHG emissions. In doing so, the businesses are able to curtail their GHG emissions ‘cost-effectively’ (Mundaca et al., 2008; Richter and Mundaca, 2013). Therefore, it is important to design the specific regulations of flexibilities well to induce obliged corporations to reduce GHG emissions promptly. In the KETS, flexibilities consist of banking, borrowing, and offset.

Although the significance of the role of flexibilities to reduce GHG emissions effectively, there have been politics behind designing the regulations of flexibilities. Adjustments to the regulations have been made due to the politics and they have resulted in the failure of inducing obliged businesses to reduce their GHG emissions.

5.3.1. Conflicts and criticism on flexibilities

- Banking

Through banking, an obliged company is able to move their unused emissions allowances of a compliance year to the next compliance year or to the next phase (ICAP, 2019). After moving its spare emissions permits, the company is able to use the spare emissions permits during the other compliance year.

As Table 6 illustrates, banking was not allowed in the pre-announcement of legislation of the KETS. In the government amendment, banking became allowed from phase to phase except from Phase 1 to Phase 2. It was for the reason that Phase 1 was normally considered as a trial period, therefore, there would be a higher chance to apportion numerous emissions permits to the first phase. If an obliged company did not consume the emissions permits of Phase 1 that much and moved the unused emissions permits to Phase2, there would be superabundant emissions permits for Phase 2. Therefore, the objective of reducing emissions as years go by would be less effective. For this reason, moving emissions permits from Phase 1 to Phase 2 was prohibited. However, from the act on the allocation and trading greenhouse gas emissions permits, banking became allowed from phase to phase without any prohibition (National Law Information Center, 2019).

Table 6. Changes in the legislative bills of banking

Pre-announcement of legislation (November 2010)	Government Amendment (April 2011)	Act on the allocation and trading of greenhouse gas emissions permits (May 2012)	Enforcement decree of the act on the allocation and trading of greenhouse gas emissions permits (July 2012)
Banking is not allowed.	Banking is allowed to the next compliance phase. However, moving emissions permits from Phase 1	Banking is allowed to the next compliance phase.	Banking is allowed to the next compliance phase.

	to Phase 2 is prohibited.		
--	---------------------------	--	--

* Source: Kim and Park (2012), p.271

According to Kim and Park (2012), the obliged businesses supported the article of banking. However, the Korean Environmental Justice Institute (2012) insisted that the article of banking – that allows moving the spare emissions permits of each company to the next compliance year – should be abolished due to its negative aspect of impeding the national GHG emissions reduction target to be achieved. Jung-Pil Lee of the Energy and Climate Policy Research Institute and researcher A of a non-governmental environmental research organization pointed out: “the regulation of banking should be tightened up if the government of South Korea is willing to reduce GHG emissions effectively through the KETS” (Lee, 19.03.19; Researcher A, 13.03.19). However, in practice, the government has adjusted the regulations of banking in favor of industries. About the situation, Lee highlighted during interview: “the government should keep focusing on GHG emissions curtailment rather than giving more options to obliged industries” (Lee, 19.03.19).

- Borrowing

Through borrowing, an obligated firm can use the part of its emissions permits that are appropriated for the next compliance year. After borrowing some emissions permits, the amount of emissions permits of the next compliance year will be deducted as much as they were moved to the previous compliance year.

Borrowing is only granted within an individual compliance phase (ICAP, 2019). An obliged company can borrow emissions permits of the other compliance years within the same compliance phase when the company is deficient in emissions allowances. The article of borrowing has been suggested since the pre-announcement of legislation of the KETS in 2010. In the enforcement decree, a condition was added that allowed only less than 10% of emissions permits of the other compliance year can be borrowed (see Table 7).

Table 7. Changes in the legislative bills of borrowing

Pre-announcement of legislation (November 2010)	Government Amendment (April 2011)	Act on the allocation and trading of greenhouse gas emissions permits (May 2012)	Enforcement decree of the act on the allocation and trading of greenhouse gas emissions permits (July 2012)
Borrowing is allowed from the other compliance year within a single Phase.	Borrowing is allowed from the other compliance year within a single Phase.	Borrowing is allowed from the other compliance year within a single Phase.	Borrowing is allowed from the other compliance year within a single Phase. Maximum 10% of emissions permits of the other compliance year are allowed to be borrowed.

* Source: Kim and Park (2012), p.272

However, the government of South Korea adjusted the regulation of borrowing in 2015 and allowed obliged corporations to borrow the 20% of their emissions permits of the next compliance year (ICAP, 2019; National Law Information Center, 2019). After that, the government adjusted the regulation once again and allowed obligated companies to borrow the 15% of their emissions permits of the next compliance year during Phase 2 (Ibid.). There is a reason for restricting the amount of borrowing emissions permits from the other compliance year within a single phase. The reason is if an obliged corporation depends on borrowing emissions allowances rather than cutting back its GHG emissions in the beginning, the amount of usable emissions permits of the other compliance year will be deficient. Accordingly, there will be an immense demand from obliged companies in purchasing emissions permits in the carbon market due to a shortage in emissions permits (Institute for Climate Change Action, 2011; Kim and Park, 2012). Owing to the high demand for emissions permits, the carbon price will increase rapidly and the carbon market will be paralyzed.

However, obliged businesses indicated their stance that they disagreed with restriction in borrowing emissions permits (Kim and Park, 2012). The businesses insisted that borrowing was only allowed within a single phase, hence, there would be no change in the total amount of allowable GHG emissions of a compliance phase (Ibid.). In this sense, the obliged entities argued there should be no restraints in the article of borrowing. Meanwhile, the environmental organizations in South Korea counter-claimed to the perspective of industries and required

necessity for raising the regulation to borrow emissions permits (Institute for Climate Change Action, 2011). Jung-Pil Lee of the Energy and Climate Policy Research Institute and researcher A of a non-governmental environmental research organization pointed out: “the regulation of borrowing should be tightened up” (Lee, 19.03.19; Researcher A, 13.03.19).

- Offset

If an obliged company contributes to reducing GHG emissions by committing emissions curtailment activities, such as CDM, outside of their business area or in the other countries, the company can get offset credits and convert them to Korean Credit Units (KCU) in the carbon market. The converted KCU can be used as emissions allowances. The article about offset credits appeared in the pre-announcement of legislation of the KETS in 2010 and was developed in the enforcement decree with restraints (see Table 8). According to the National Law Information Center (2019), the emissions curtailment activities that have been conducted in South Korea can be exchanged to offset credits, but up to 10% of the amount of a corporation’s given emissions permits can be exchanged. The emissions curtailment activities, such as CDM, that are committed outside of South Korea can be exchanged to offset credits, but no more than 50% of the total amount of offset can be exchanged.

Table 8. Changes in the legislative bills of offset

Pre-announcement of legislation (November 2010)	Government Amendment (April 2011)	Act on the allocation and trading of greenhouse gas emissions permits (May 2012)	Enforcement decree of the act on the allocation and trading of greenhouse gas emissions permits (July 2012)
Offset credits can be given to an obliged corporation when the firm does extra curtailment activities outside of its firm area.	Offset credits can be given to an obliged corporation when the firm does extra curtailment activities outside of its firm area.	Offset credits can be given to an obliged corporation when the firm does extra curtailment activities outside of its firm area.	Offset credits can be given to an obliged corporation when the firm does extra curtailment activities outside of its firm area – within South Korea or outside of the country. 1 ton CO ₂ eq is equal to 1 Korean Credit Unit (KCU). 1 Offset credit is equal to 1 KCU. The extra curtailment activities in South

			<p>Korea can be exchanged to offset credits, but only 10% of the corporation's given emissions permits.</p> <p>The extra curtailment activities that are committed outside of South Korea can be exchanged to offset credits, but no more than 50% of the total amount of offset against GHG emissions.</p>
--	--	--	---

* Source: Kim and Park (2012), p.274

Obligated businesses contended that the restraints of exchanging offset credits should be revoked (Kim and Park, 2012). They requested the government to approve the 100% of offset credits to be exchanged (Ibid.). On the contrary to the perspective of industries, the South Korean environmental organizations contended that the offset article should be abolished (Korean Federation for Environmental Movement, 2010). According to the joint-statement of various environmental organizations, offset credits should not be considered to be utilized as emissions allowances of obliged industries on the grounds that such emissions reduction activities – for instance, CDM – have devastated local communities and ecosystem of developing countries (Ibid.). Jung-Pil Lee of the Energy and Climate Policy Research Institute said during the interview: “the government of South Korea should minimize the approval of offset credits to induce obliged corporations to focus on curtailing GHG emissions in their business area” (Lee, 19.03.19).

5.3.2. Problem of utilizing flexibilities and the market behavior of industries

In the previous section, the role of flexibilities and the changes in legislative bills of each flexibility were explained. The changes in legislative bills were made by the government of South Korea based on embracing the perspective of obliged industries and the stance of environmental organizations. Conflicts and criticisms on the regulations of each flexibility have arisen between the industries and the environmental organizations. Each restraint of flexibilities has been changed by the government of South Korea to compromise the opinions of both industries and environmental organizations and to make the carbon market operate better since the enforcement decree was announced.

The core function of flexibilities is to induce obliged companies to reduce their GHG emanations cost-effectively by using market mechanisms. The other function is to reduce economic damages that obliged corporations may get while the companies curtail their GHG emissions. In other words, flexibilities of the KETS are utilized as a safety tool for obligated firms. In practice, however, flexibilities have caused a malfunction in the carbon market. This brings up questions to the effectiveness of market-oriented climate policy, such as the KETS.

First of all, banking emissions permits to the next compliance phase impedes obliged companies to achieve the GHG emissions reduction goal of the next phase. Obligated companies, that have abundant spare emissions allowances, have not attempted to take a risk of having emissions permits shortage in the future by selling their spare permits in the carbon market. Hence, they would rather make a decision to hold spare permits and use them during the next compliance phase. According to the Maeil Business Newspaper (2019), spare emissions permits of some obliged companies have not been traded in the carbon market and they have mostly been moved to the next compliance phase. Meanwhile, the other obligated corporations – that have failed to emanate less GHGs than their given emissions permits – have attempted to purchase emissions allowances in the carbon market. However, the carbon price has rapidly been increased since 2015 due to the high demand for purchasing additional permits but not enough supply in the market. Indeed, approximately 45% of obliged corporations experienced emissions permits shortage and high carbon price in 2017 (Kim et al., 2018; Korea Economic Daily, 2017; Ministry of Environment, 2018c). On the contrary to this scenario, if banking is not allowed from phase to phase, the carbon price will crash down. Companies that have emanated GHGs less than their emissions permits would attempt to consume all of their spare permits or to sell them in the carbon market. This situation will cause too much supply in the carbon market, therefore, the carbon price will plunge. The other companies that have failed in reducing emissions would try to buy additional permits as much as possible to have more right to pollute rather than investing their money to invent non-carbon-dependent facilities or curtailing their emissions. The objective of using flexibilities is to cut back GHG emanations ‘cost-effectively’, however, it will keep repeating this dilemma. No matter what the purpose of banking is, it is hard to dodge criticisms which claim banking hinders obliged corporations from finding better solutions to reduce GHG emissions expeditiously.

The borrowing article has not caused immense problems yet. However, the government of South Korea allocated additional emissions permits to every corporation in 2017 due to the

change in the national GHG emissions reduction goal (see Table 2). Accordingly, the companies, that could have not been able to borrow enough emissions permits from the other compliance year, did not have to expend their money to buy additional permits in the carbon market or to pay the penalty for emitting more GHGs. In addition to that, the government of South Korea alleviated the restriction – that allowed borrowing up to 10% of the emissions permits of the next compliance year – to allow up to 20% of the other compliance year’s allowances during Phase 1 and up to 15% during Phase 2 (ICAP, 2019; Lee et al., 2017; National Law Information Center, 2019). Thus, these interferences of the government are not virtually being helpful to obliged companies to reduce their emissions, but rather they are only contributing to maintaining the same emissions level of previous years.

Lastly, it is also a controversial issue to allow obliged corporations to receive emissions allowances through exchanging offset credits. The biggest problem of approving offset credits is that the offset proportion of the national GHG emissions reduction target had been set too high. In the 2030 national GHG emissions reduction roadmap⁶, the proportion of offset was set to 11.3% (96 million ton CO₂eq), while the proportion of GHGs cutback within industries was set to 25.7% (219 million ton CO₂eq) (Ministry of Environment, 2015). The Energy and Climate Policy Research Institute (2018) criticized that only 219 million ton CO₂eq could be reduced within obliged industries due to the high proportion of approving offset reduction and therefore, South Korea would emit 632 million ton CO₂eq in 2030. It is more significant to reduce GHG emissions within the country, however, the government put too much proportion on offset target (Ibid.). After this argument from the research institute, the government of South Korea decreased the proportion of offset target from 11.3% (96 million ton CO₂eq) to 4.5% (38.3 million ton CO₂eq) (Ministry of Environment, 2018a; Ministry of Environment, 2018b). However, the 2030 national emissions target is still 574.3 million ton CO₂eq and it is yet to be lower than the 2020 target⁷. In this sense, offset credits may be a good resource for obliged firms to get additional emissions permits, however, they hinder the polluters taking more responsibility to lessen their emissions subversively in the country.

⁶ The second national GHG emissions reduction roadmap

⁷ The 2020 national GHG emissions reduction target was decreasing emanations by 30% compared to the BAU emissions. The 2020 national reduction target was 543 million ton CO₂eq.

6. Discussion

Emissions trading system, which is a market-oriented climate policy, has been considered as a means of reducing GHG emissions ‘cost-effectively’. It has been implemented in many regions, including South Korea, as if it could be the realistic and reasonable emissions curtailment model in terms of guaranteeing profits of industries through continuous economic growth and simultaneously protecting natural environment and climate to some extent (Paterson, 2011). The idea – that is, entrusting the burden of reducing GHG emissions to the polluting industries – has seemed promising. Corporations, that are obliged to reduce GHG emissions, are able to contribute to securing the environment as far as they do not get economic damages and lose their profits. Trading carbon emissions permits enables obliged corporations to decide the extent of emissions reduction autonomically by offering the corporations a chance to purchase additional emissions allowances or to merchandise their unused emissions permits in carbon markets. Notwithstanding, it has been revealed that this ‘trading carbon’ concept has not been influencing the polluters to diminish their emissions to an immense extent (Hildingsson and Koch, 2016; Koch, 2012; Magdoff and Foster, 2011; Vlachou and Pantelias, 2017a). Rather, the concept has been offering an exemption to the polluters to continue making profits through their carbon-dependent economic activities (Ibid.).

The emissions trading and environment protect mechanism has been embraced and implemented in South Korea since 2015. Resembling to the criticized ETS cases of the other regions, the case of the KETS has divulged the underlying political-economic context of implementing the emissions trading policy. According to the interviews that I conducted in South Korea (see section 5.1.), the government of South Korea of the time attempted to promote the national image of South Korea as a leading environment-friendly country in Asia. By declaring that South Korea would reduce GHG emissions through the KETS in the first place, the government of South Korea could evade following the international criteria of emissions cutback. Instead, the government came up with its own national GHG curtailment target and set the extent of total allowable GHG emanations based on the target. In addition to that, the government of South Korea did not agree with the counterarguments of environmental organizations that the KETS was commodifying carbon and it would cause inequality in the society (Kim and Park, 2012). Thereby, numerous conservative perspectives – that is, the economic competitiveness is more important than the environment – of the

government of the time were applied to the contents of the KETS (Ibid.). According to the governmental document of the Ministry of Economy and Finance (2017, p.16), the fundamental direction of implementing the KETS is to minimize the negative effects of the KETS on economic growth and employment and to protect the alleged ‘vulnerable industries’ – that are highly carbon-reliant – from the negative influence of the KETS to perform well in international markets. Indeed, the government of South Korea is locked in the ‘economic growth is absolutely crucial’ frame and have been adjusting the regulations of the KETS in favor of the industries.

Nevertheless, the industries of South Korea have reiterated that the reduction target was set too high and it will slow down economic growth (Federation of Korean Industries, 2011; Korea Economic Daily, 2017; Maeil Business Newspaper, 2014; Maeil Business Newspaper, 2015; Maeil Business Newspaper, 2019). They have been claiming that obliged companies will not be able to evade from paying penalty for their emanations due to the ridiculously high emissions reduction target (Ibid.). Furthermore, they have insisted the restriction on GHG emissions will precipitate an economic crisis in South Korea by lessening the domestic production and pushing away the production facilities to overseas (Maeil Business Newspaper, 2015). Under this political-economic context, although there have been numerous counterarguments from the environmental organizations (Energy and Climate Policy Research Institute, 2018; Green Korea, 2014; Korean Environmental Justice Institute, 2012; Korean Federation for Environmental Movement, 2010; Korean Federation for Environmental Movement, 2012), the circumstance – that the government of South Korea has been changing the regulations of the KETS in favor of obliged industries – have been uncovered in the sections of this thesis (see section 5.1., 5.2.1., 5.2.2., 5.3.1., and 5.3.2.).

As discovered in the sections of the findings and analysis part (see section 5.1., 5.2.1., 5.2.2., 5.3.1., and 5.3.2.), the regulations of the way of allocating emissions permits and the specific articles of each flexibility have been changed and set to accommodate the situation of obliged industries. First of all, the emissions permit allocation has been happened in favor of the industries. In section 5.2.1., it is revealed that emissions allowances are allocated the most to the biggest polluters. The top 5 biggest polluters are in this order: energy and electricity corporations, steel industry, petrochemical firms, cement companies, and oil refinery industry. The KETS has been mostly using grandfathering allocation method – that is, corporations are given emissions permits based on their previous GHG emanations outcome – and it has resulted in that the largest polluters are provided more emissions allowances than the

companies that have emitted GHGs relatively less. In contrast to grandfathering allocation methods, benchmarking method is the way of providing emissions permits the most to corporations that have emitted less due to their less-carbon-reliant production facilities. This method has been applied to the industries, such as oil refinery, cement, and aviation, starting from Phase 1 and the rest of companies have been provided their emissions allowances based on grandfathering method. According to the governmental report of the Ministry of Economy and Finance (2017), benchmarking allocation method was supposed to be adopted as criteria of distributing emissions allowances from the beginning of Phase 2. However, the benchmarking method was not adopted although the first compliance year of Phase 2 was started. According to Today Energy (2019), the government of South Korea explained the benchmarking allocation method would expand to be applied from the beginning of 2019. In doing so, companies – that have emitted GHGs more than the other entities and polluted the environment – have been backed up by the government to keep emanating GHGs without reducing their emissions expeditiously.

In section 5.2.1., it is also explained that the government of South Korea has been allocating emissions allowances to obliged corporations based on the national GHG emissions reduction target. However, the national reduction goal is built on the BAU emissions emanation target. The biggest problem of the BAU target is that it does not give the information about the absolute quantity of must-be-reduced GHG emissions right now (Kim and Park, 2012; Energy and Climate Policy Research Institute, 2018). Rather, it gives information about the expected amount of GHG emissions in 2030 without implementing any climate policy and the government offers the reduction plan based on the information. The trap of the BAU emissions target is that it presents the thought of the government of South Korea that economic growth is imperative, therefore, the increase of GHG emissions is inexorable (Kim and Park, 2012). In this sense, the actual total GHG emissions of the country continue to increase although the alleged GHGs reduction climate policy has been implemented since 2015 (see Table 3). In addition to that, the BAU reduction target was changed in 2016 from 30% of BAU of 2020 to 37% of BAU of 2030. The numerical value shows as if the goal of curtailment is reinforced. However, if we investigate the governmental document of the Ministry of Environment (2014a; 2018a), it is noticeable that the 2020 BAU target was 543 million ton CO₂eq after reduction and the 2030 BAU target is 574.3 million ton CO₂eq after curtailment. Through changing the national GHG reduction target based on the BAU emissions, obliged companies are able to emit more GHGs. At this point, it is undebatable

that the BAU target does not contribute to decelerating climate change, but rather it gives exemption to the polluting companies.

Add to the problem of grandfathering allocation method and the BAU emissions target, the proportion of free allocation and auctioning have been changed and set by the government of South Korea in favor of obliged industries. Obligated corporations have been insisting that the government should allocate emissions permits to industries for free, otherwise it will become a huge financial burden to themselves if they have to purchase emissions allowances in the carbon market through auctioning. Responding to the industries, the government of South Korea has been changing the regulation on the proportion of free allocation to accommodate obliged industries (see Table 4). In the pre-announcement of legislation of the KETS, auctioning was suggested with more proportion than the enforcement decree of the KETS. The proportion of free allocation of Phase 1 was set more than 90% and auctioning proportion rate was set to 100% for Phase 3 in the pre-announcement of legislation. However, in the enforcement decree of the KETS, the proportion of free allocation for Phase 1 became 100% and auctioning proportion rate for Phase 3 became only more than 10% of total emissions permits (see Table 4). Furthermore, one condition was added that allows the trade-intensive and carbon-intensive corporations to get emissions permits free of charge no matter which phase they are in. Those corporations are considered as alleged 'economically vulnerable' to be affected by the 'surprisingly high' GHG emissions target. For such a reason, the government made this decision. The Korean Federation for Environmental Movement (2012) and Kim and Park (2012) castigated that the condition was added to accept the strong demand from obliged corporations and to protect their businesses by not requiring them for purchasing emissions allowances.

The rule of additional allocation has been adjusted for gratifying obliged industries as well. In the pre-announcement of legislation, the rule about additional allocation did not exist. The article about additional allocation of emissions allowances was added from the government amendment and more specific conditions were added to the article in the enforcement decree. According to the enforcement decree (see Table 5), the competent authority, which is the Ministry of Environment, shall be allocating additional allowances to an obligated company for a compliance year after the deliberation of the allocation decision committee. In this case, less than 50% of the increase in GHG emissions will be covered by allocating additional emissions permits. Add to that, additional permits can be distributed to an obligated corporation only when the amount of GHG emanations of the company increases by more

than 30% compared to the emissions permits that are allocated to a compliance year. One more condition to this article about additional allocation is that supplementary permits will be given when an obliged firm have changes in their production items, business plans, or production facilities. However, industries have been claiming that the government must allocate supplementary allowances for 100% of the increase in their GHG emanations. On top of that, they have been insisting that the government must offer additional permits to the companies when they emitted GHGs more than 10% compared to their emissions permits of a compliance year. Although the government has made many changes in the regulations of the KETS for industries, the Federation of Korea Industries (2014) condemn the government that the conditions of additional allocation are ridiculous, therefore, the government should offer more generous conditions for the industries. It is completely nonsensical that the polluters never stop claiming more generous regulations for their interests and showing their strong will to keep contaminating the environment for alleged 'economic growth'.

The government of South Korea has been adjusting the regulations of emissions permit allocation accommodating the situation of obliged industries. In addition to that, the government has been changing the specific rules of flexibilities, such as banking, borrowing, and offset, to comfort the industries in terms of reducing GHG emissions and maintaining their profits through economic activities simultaneously (see section 5.3.1.). Flexibilities per se are used as safety tools to reduce the burden of GHG emissions reduction of obliged corporations. Moreover, flexibilities are designed to induce businesses to curtail their emissions 'cost-effectively'. Although flexibilities per se are showing solicitude for industries, the specific rules of each flexibility have been adjusted in favor of industries. In the KETS, there are three flexibilities: banking, borrowing, and offset. Firstly, banking allows an obligated corporation to move its spare emissions permits to the next compliance year or the next compliance phase (see section 5.3.1.). The firm can use its unused emissions allowances during the next year or phase. The advantage of banking is that an obliged company can hedge against emissions permits shortage of near future. However, banking gives a negative impact on reducing GHG emissions as years go by and could cause a shortage of emissions permits supply in the carbon market. Banking was not allowed in the beginning of the legislation of the KETS, but obliged corporations could use banking in the end (see Table 6). Banking unused emissions permits to the next phase is now allowed without any prohibition. Obligated industries support the rule of banking, but environmental organizations were against this generous banking rule and insisted that banking would impede

the accomplishment of the national GHG emissions reduction target (Korean Environmental Justice Institute, 2012).

Secondly, borrowing allows an obligated firm to use some of its given emissions permits that are appropriated for the next compliance year (see section 5.3.1.). When a company is deficient in emissions allowances, the company can borrow a maximum of 10% of the next compliance year's emissions permits and can use them in the current compliance year (see Table 7). A negative impact of borrowing is that if an obliged firm relies on borrowing emissions permits of the other compliance year rather than curtailing its GHG emissions at the time, the carbon market will not work due to breakneck increase in carbon price by high demand and shortage in emissions allowances in the carbon market (Institute for Climate Change Action, 2011; Kim and Park, 2012). Although the risks that borrowing could give, obliged industries insist that there should be no restraints in borrowing emissions permits (Kim and Park, 2012). In addition to that, borrowing is only allowed within a single phase, but industries have been insisting that borrowing emissions permits from the next phase should be allowed (Construction Economic Daily, 2017). Due to the strong demand of obliged industries, the government of South Korea adjusted the condition of borrowing article. The adjusted condition allowed obliged corporations to borrow the 20% of their emissions permits of the next year (ICAP, 2019; National Law Information Center, 2019). After that, the government re-adjusted the regulation and allowed obliged firms to borrow the 15% of their emissions allowances of the next compliance year during Phase 2 (Ibid.). Indeed, the government attempted to adjust the regulations of borrowing article in favor of the industries. In contrast to the claim of industries, environmental organizations urge to raise the regulation rate of borrowing (Kim and Park, 2012).

Lastly, offset allows an obliged company to get extra emissions allowances if it has contributed to curtailing GHG emissions outside of its business area (see section 5.3.1.). It means that an obliged company can exchange their offset credits – that are collected through external GHG emissions curtailment activities, for instance, CDM – to emissions allowances. The corporation can use the obtained extra emissions permits to emanate GHGs more in its business area. The regulations of offset were set in the enforcement decree (see Table 8). If a company has conducted emissions reduction activities in South Korea, the company can get offset credits within the range of 10% of its given emissions permits. If a company has conducted reduction activities overseas, the company can get offset credits maximum 50% of its emissions reduction. Obligated industries contended that the regulations on offset credits

should be revoked (Kim and Park, 2012). Environmental organizations in South Korea insist that the government should not allow offset credits at all (Korean Federation for Environmental Movement, 2010).

As illustrated in section 5.3.1., each flexibility has been designed to accommodate the situation of obliged industries. Accordingly, emissions permit trading should have actively happened in the carbon market to reduce GHG emissions so-called ‘cost-effectively’. However, flexibilities have caused malfunctions in the carbon market and obliged industries failed to reduce their emissions cost-effectively. This fact alludes to the ineffectiveness of the market-oriented climate policy, which is the KETS. Market behavior of obliged corporations based on flexibilities proves that market-based mechanism does not help the industries to reduce their emissions cost-effectively and will not be able to contribute to cutting back GHG emissions promptly. For example, most of companies that had a lot of spare emissions permits did not trade them in the carbon market, but they moved their spare permits to the next compliance phase (Maeil Business Newspaper, 2019). Therefore, the rest of the obligated corporations, that have failed to emit less GHGs than their given emissions allowances, attempted to buy additional emissions permits in the carbon market. However, the carbon price increased rapidly due to lack of supplies. As a result, approximately 45% of obliged corporations experienced emissions permits shortage. Under this situation, the government distributed additional emissions permits to every entity in 2017 due to the new reduction roadmap, which is the 2030 national emissions curtailment roadmap. The national reduction target changed from reducing emissions by 30% compared to the 2020 BAU emissions to reducing emissions by 37% compared to the 2030 BAU emissions. Therefore, the amount of total allowable GHG emissions of 2017 were increased, Accordingly, every obliged corporation could get additional emissions allowances (Ministry of Trade, Industry and Energy, 2017). In doing so, the purpose of implementing the market-oriented emissions trading system did not function well and the KETS failed to achieve its goal to induce obliged companies to cut back their emissions cost-effectively. The proportion of approving offset as national GHG emissions reduction also caused many issues. Instead of reducing GHGs within the production facilities, industries had a chance to reduce emissions of somewhere outside of their business area and they could exchange the offset credits to additional allowances. Thereby, industries achieved more right to pollute the country rather than making the environment of the country better. These evidences prove the weakness of relying on flexibilities and the market-oriented climate policy to reduce GHG emissions.

In the previous paragraphs of this section, what political-economic context was underlying the implementation of the KETS and how the specific rules of allocation and flexibilities have been changed to accommodate industries have been revealed. In addition, it was able to prove that the KETS has been unsuccessful in reducing the national GHG emissions by investigating the political-economic context and the policy design of the KETS. Throughout looking into those to answer to the first and second research questions, it is now available to ascertain how the green capitalist approach is embedded in the implementation of the KETS and the process of setting allocation and flexibilities. Green capitalist approach believes that market-based solutions will be putting the broken environment in a better state (Rogers, 2010). The bottom line of green capitalist approach is that if green investment and market work well, profits will still be generated through economic growth and the environment will be protected at the same time. The discussion about the implementation of the KETS also starts from the premise that GHG emissions will be reduced through a market-oriented climate policy, which is emissions trading mechanism, so that South Korea will not lose profits by continuing economic growth and will preserve the environment (Ha and Byrne, 2019). However, if we think in the other way around, the contention of the green capitalist approach connotes that there will be no environmental protection if the market-based climate policy fails through the unsuccess of the carbon market. Indeed, the South Korean emissions trading climate policy case has proved that the carbon market has been malfunctioning due to the government and the market behavior of obliged industries that is caused by the rules of allocation and flexibilities. The KETS has not been able to reduce GHG emissions promptly and ‘cost-effectively’. On top of that, the government of South Korea has anticipated that obliged industries will not only reduce their GHG emissions but also they will invest to invent new green technology through the KETS (Ministry of Economy and Finance, 2017), but the total national GHG emissions of South Korea has been increased although the KETS has been carried out (National Index System, 2018). Harris (2014, p.44) points out that the “pre-existing technology” – which is, fossil fuels – has encroached on and taken over the current industries. Therefore, it will be hardly realized to make an enormous change in this domain through green technology (Ibid.).

In addition to the dilemma of green capitalism, the commodifying carbon concept of the KETS is problematic. According to Lohmann et al. (2006), the definition of a commodity is that it has value in itself so that it can be exchanged for something else. Moreover, a commodity can produce economic profits by being traded in markets (Ibid.). In other words,

carbon is commodified and considered as a ‘tradable’ commodity under the KETS and it is traded in a form of ‘emissions permits’ in the carbon market. Indeed, some obliged industries have been making many profits by purchasing the ‘commodities’ – emissions permits – and selling them in the carbon market with high margin (Maeil Business Newspaper, 2019). On top of that, obliged industries are still making economic profits through their carbon-dependent production activities without acknowledging the necessity of changing the paradigm due to the industries-favorable KETS. In this context, it is concluded that the KETS - that is, the market-oriented climate policy – is not meant to be successful in terms of reducing GHG emissions expeditiously in the first place. The KETS has not subverted the structure of capitalism. Rather, the KETS is built on the green capitalist approach and has been changing the rules of allocation and flexibilities in favor of obliged industries. Hence, the KETS has not been able to reduce GHG emanations rapidly due to the fundamental negative facet of green capitalism – which is, accumulation by production and pursuing profits.

7. Conclusion

The aim of this study was to examine and understand the relation between the malfunction of the KETS in reducing GHG emissions and the political-economic context that underlies the implementation and the policy design of the KETS. To accomplish the aim, this thesis has concentrated on investigating how the emissions permit allocation system and the flexibilities have been adjusted and set in favor of obliged corporations by the government of South Korea.

According to the findings of this research, the government has been adjusting specific regulations of emissions allowances allocation and flexibilities to accommodate the enterprises that are obliged to the KETS and to protect the interests of obliged corporations. The government of South Korea expected that the implementation of the KETS would stimulate obliged industries to curtail the GHG emissions cost-effectively by trading their emissions permits in the carbon market. In doing so, the government anticipated that the KETS would not only reduce the national GHG emissions but also uphold economic growth of the country. However, the market-oriented climate policy, which is the KETS, has been unsuccessful in enticing obliged industries into utilizing the carbon market to transact their

emissions permits with the other industries. Through scrutinizing the market behavior of obliged entities based on flexibilities, the result was drawn that most of the obliged industries made a decision to not to trade their emissions permits in the carbon market, Hence, the carbon price increased rapidly due to the short supply of emissions permits in the market. Therefore, the objective of operating the KETS, that obliged companies can reduce their GHG emission cost-effectively, has not been able to be realized. In addition, the policy design of emissions allowances allocation system has been set and adjusted to protect the interests of obligated corporations. Examining the political-economic context behind setting the flexibilities and the emissions permit allocation, this research was able to discover the relation between the policy design of the KETS and the limitation of the scheme with respect to reducing GHG emissions. Throughout looking into the political-economic contexts, it was also available to explain how the green capitalist approach embedded in the implementation and the policy design of the KETS. The KETS itself was built on the premise of the green capitalist perspective that economic growth can be continued with reducing GHG emissions through the market-based climate policy.

Having this study as an input, there can be subsequent research undertaken to investigate the other factors (e.g. the structure of South Korean energy and electricity businesses) that influenced the malfunction of the KETS in diminishing the national GHG emissions. Furthermore, there can be more research conducted to reframe the current market-based climate policy of South Korea and suggest better policies that could reduce GHG emissions promptly to stop exacerbating climate change.

8. Bibliography

Asian Development Bank. (2018). *The Korean Emissions Trading Scheme: Challenges and Emerging Opportunities*. Manila: ADB Publications. Available at:

<https://www.adb.org/sites/default/files/publication/469821/korea-emissions-trading-scheme.pdf>.

(Accessed: 25 April 2019).

Berg, B. L. (2001). *Qualitative research methods for the social sciences* (4th edn.). Boston, MA: Allyn and Bacon.

Bowen, G.A. (2009). Document analysis as a qualitative research method. *Qualitative research journal*, 9(2), pp.27-40.

Bryant, G. (2018). Nature as Accumulation strategy? Finance, nature, and value in carbon markets. *Annals of the American Association of Geographers*, 108(3), pp.605-619.

Böhm, S., Misoczky, M.C. and Moog, S. (2012). Greening capitalism? A Marxist critique of carbon markets. *Organization Studies*, 33(11), pp.1617-1638.

Carton, W. (2017). Dancing to the Rhythms of the Fossil Fuel Landscape: Landscape Inertia and the Temporal Limits to Market-Based Climate Policy. *Antipode*, 49(1), pp.43-61.

Castree, N. (2008). Neoliberalising nature: the logics of deregulation and reregulation. *Environment and Planning A*, 40(1), pp.131-152.

De Perthuis, C. and Jouvet, P.A. (2015). *Green capital: A new perspective on growth*. New York: Columbia University Press.

Construction Economic Daily. (2017). 온실가스 배출권 부담에 등골 휘는 시멘트 업계 [Press release]. 12 July. Available at:

http://ets.energy.or.kr/WEBSITE/download/download_board.aspx?atch_sct=PRESS&no=1&pno=94.

(Accessed: 9 May 2019).

Creswell, J. W. and Creswell, J. D. (2018). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches* (5th edn.). Los Angeles, CA: SAGE.

Energy and Climate Policy Research Institute. (2018). 2030 온실가스 감축 로드맵에 대한 시민사회 공동 의견서 [Press release]. 14 May. Available at:

http://ecpi.or.kr/epbrd/bbs/board.php?bo_table=bbs6&wr_id=9074. (Accessed: 3 May 2019).

Federation of Korean Industries. (2011). 배출권거래제 도입 논의의 현황과 문제점 [Press release]. 11 January. Available at:

http://www.fki.or.kr/FkiAct/Promotion/Opinion/View.aspx?content_id=8feebae9-2502-4816-8fe7-8afe99794d97. (Accessed: 4 May 2019).

Federation of Korean Industries. (2014). *국가 배출권 할당 계획에 대한 산업계 공동 성명서* [Press release]. 2 June. Available at: <http://www.fki.or.kr/Common/Download.aspx?id=8ae77499-f147-4a0d-918f-2b6e39f07cc6>. (Accessed: 9 May 2019).

Future Strategy Institute of Korea Development Bank. (2018). *주간 KDB 리포트 (2018.02.19) - 배출권거래제 2 차 계획기간 시작과 의미* [Weekly KDB Report (2018.02.19) - The start and the implication of Phase 2 of the Korean emissions trading scheme]. Available at: https://rd.kdb.co.kr/er/wcms.do?actionId=ADERERERWCE06&contentPage=/er/er/er/ERER27I00016_01RS.jsp. (Accessed: 16 April 2019).

Green Korea. (2014). *대기업, 온실가스 배출량 급증* [Press release]. 12 June. Available at: <http://www.greenkorea.org/?p=40203>. (Accessed: 4 May 2019).

Guttmann, R. (2018). *Eco-Capitalism: Carbon Money, Climate Finance, and Sustainable Development*. Cham: Palgrave Macmillan.

Ha, Y. -H. and Byrne, J. (2019). The rise and fall of green growth: Korea's energy sector experiment and its lessons for sustainable energy policy. *Wiley Interdisciplinary Reviews: Energy and Environment*, p.e335.

Han, J. and Yun, S.-J. (2011). Policy Network for Actors in the Introduction of Greenhouse Gas Emission Trading Scheme: Focusing on Social Network Analysis. *Korea Policy Studies Review*, 20(2), pp.81-108.

Harris, J. (2013). Can green capitalism build a sustainable society?. *International Critical Thought*, 3(4), pp.468-479.

Hildingsson, R and Koch, M. (2016). Market Solutions to Climate Change: Examples of Carbon Trading and Carbon Rationing. in M Koch & O Mont (eds.), *Sustainability and the Political Economy of Welfare*. Routledge Studies in Ecological Economics, no. 42, Routledge, pp. 95.

Institute for Climate Change Action. (2011). *(긴급토론회) '배출권 거래제 쟁점과 바람직한 도입방안' 기록 및 언론보도* [Press release]. 23 November. Available at: http://climateaction.re.kr/index.php?document_srl=21557&mid=act01&page=2&npage=2. (Accessed: 5 May 2019).

International Carbon Action Partnership (ICAP). (2017a). *ICAP Briefs on Emissions Trading Basics – ICAP Brief #6 How Emissions Permits are Distributed*. Available at: https://icapcarbonaction.com/en/?option=com_attach&task=download&id=493. (Accessed: 14 April 2019).

International Carbon Action Partnership (ICAP). (2017b). *ICAP Briefs on Emissions Trading Basics – ICAP Brief #7 Flexibility in Emissions Trading*. Available at: https://icapcarbonaction.com/en/?option=com_attach&task=download&id=494. (Accessed: 14 April 2019).

International Carbon Action Partnership (ICAP). (2019). *ETS detailed information: Korea Emissions Trading Scheme*. Available at:
[https://icapcarbonaction.com/en/?option=com_etsmap&task=export&format=pdf&layout=list&system_s\[\]=47](https://icapcarbonaction.com/en/?option=com_etsmap&task=export&format=pdf&layout=list&system_s[]=47). (Accessed: 25 April 2019).

International Energy Agency (IEA). (2018). *Total CO2 emissions of South Korea*. Available at:
<https://www.iea.org/statistics/?country=KOREA&year=2016&category=Emissions&indicator=TotCO2&mode=chart&dataTable=INDICATORS>. (Accessed: 16 April 2019).

Kenis, A. and Lievens, M. (2015). *The limits of the Green Economy: From re-inventing capitalism to re-politicising the present*. New York: Routledge.

Kim, C. -H. (2012). Environmental Law, Policies and Projects against Climate Change in Korea: Based on the Framework Act on Low Carbon and Green Growth. *Law Review*, 19(2), pp.149-192.

Kim, E. and Park, J. (2012). Conflict Studies on Carbon Emission Trading Policies. *Korea Institute of Public Administration*, pp.1-431.

Kim, I. (2013). Structuring Efficient Domestic Emissions Trading System and Networking with the International Trade Market. *International Trade Law*, 114, pp.51-81.

Kim, J. -I. and Yoo, T. -H. (2012). A Critical Review on the Greenhouse Gas Emission Trading Schemes. *Journal of Korean Social Trend and Perspective*, 85, pp.330-357.

Kim, K., Shim, S. and Lee, J. (2018). Diagnosis and Improvement Plan for the Korean Emissions Trading Scheme. *Korea Energy Economic Review*, pp.1-96.

Kim, S. (2018). Decomposition analysis of GHG emission factor in the domestic power generation sector. *Korea Energy Economic Review*, 17(1), pp.241-264.

Kim, S., Oh, I. and Cho, K. (2013). Comparative analysis on the impact of carbon tax and emission trading scheme on regions in Korea. *Innovation Studies*, 8(1), pp.3-32.

Knight, C. (2013). What is grandfathering?. *Environmental Politics*, 22(3), pp.410-427.

Koch, M. (2012). *Capitalism and climate change: Theoretical discussion, historical development and policy responses*. Basingstoke: Palgrave Macmillan.

Korea Chamber of Commerce and Industry (KCCI). (2012). *산업계와 긴밀히 협력해 나가기로* [Press release]. 4 May. Available at:
<http://www.korcham.net/nCham/Service/ECONBrief/appl/EconInfoDetail.asp?SEQNO=88080>. (Accessed: 4 May 2019).

Korea Economic Daily. (2017). “남는 탄소배출권 연내 팔아라” [Press release]. 6 April. Available at:
<https://www.hankyung.com/economy/article/2017040579601>. (Accessed: 6 May 2019).

- Korea Economic Daily. (2018). 발전, 항공 등 26 개 업종에 탄소배출권 유상할당... 기업부담 연 1700 억 [Press release]. 11 July. Available at: <https://www.hankyung.com/economy/article/2018071116901>. (Accessed: 4 May 2019).
- Korean Environmental Justice Institute. (2012). 배출권 거래법 시행령 제정에 관한 시민사회단체 (38 개 단체) 의견서 [Press release]. 28 August. Available at: <http://eco.or.kr/eco2016/wp-content/plugins/uploadingdownloading-non-latin-filename/download.php?id=35898>. (Accessed: 4 May 2019).
- Korean Federation for Environmental Movement. (2010). 유상할당, BAU 기준 제고, 담당기관 이전 등의 조치 없는 배출권 거래제 의미 없어 - 환경운동연합, 온실가스배출권거래제도에 대한 의견서 제출 [Press release]. 8 December. Available at: http://kfem.or.kr/wp-content/uploads/2010/12/1419319325_eQ9MqX.hwp. (Accessed: 5 May 2019).
- Korean Federation for Environmental Movement. (2012). 시행부터 반쪽짜리 배출권 거래제 [Press release]. 25 July. Available at: <http://kfem.or.kr/?p=13740>. (Accessed: 4 May 2019).
- Lee, B. and Lee, Y. (2013). A Study on the Emission Trading Scheme for Reducing Greenhouse Gas from Ships. *Maritime Law Review*, 25(1), pp.29-62.
- Lee, H. -Y. (2012). A Study on the introduction of the Emissions Trading Scheme: focusing on compounding regulatory policy means. *Korea Public Management Review*, 26(2), pp.89-112.
- Lee, S., Cho, Y. and Lee, S.-K. (2017). Analysis of CO2 Reduction effected by GHG Energy Target Management System (TMS) and Korea Emissions Trading Scheme (ETS). *Journal of Climate Change Research*, 8(3), pp.221-230.
- Leonardi, E. (2017). Carbon trading dogma: Theoretical assumptions and practical implications of global carbon markets. *Ephemera: Theory and Politics in Organization*, 17(1), pp.61-87.
- Lim, H. -S., Choi, E. -K., Lee, M. -Y. and Shin, S. -C. (2014). An Analysis on Main Issues and Policy Implications of Korean Emission Trading Scheme - Focused on the Semiconductor Industry of Korea. *Journal of Climate Change Research*, 5(2), pp.179-187.
- Lohmann, L. (2008). Carbon trading, climate justice and the production of ignorance: ten examples. *Development*, 51(3), pp.359-365.
- Lohmann, L. (2012). Financialization, commodification and carbon: the contradictions of neoliberal climate policy. *Socialist register*, 48(85), p.107.
- Lohmann, L., Hällström, N., Österbergh, R. and Nordberg, O. (2006). *Carbon trading: a critical conversation on climate change, privatisation and power*. Uppsala: Dag Hammarskjöld Centre.

Maeil Business Newspaper. (2014). *내년 시행 앞둔 탄소 배출권거래제 - 시행 코 앞인데 '꼭 해야 하나' 알가왈부* [Press release]. 7 July. Available at:

<https://www.mk.co.kr/opinion/columnists/view/2014/07/964231/>. (Accessed: 8 May 2019).

Maeil Business Newspaper. (2015). *5년 전보다 후퇴한 정부 감축안 "이것도 달성 힘겹다" 기업 반발 거세* [Press release]. 22 June. Available at:

<https://www.mk.co.kr/news/business/view/2015/06/593254/>. (Accessed: 8 May 2019).

Maeil Business Newspaper. (2019). *탄소배출권규제에 신음하는 기업들 - 가격 폭등해도 정부 무대책, 기업만 '헉헉'* [Press release]. 4 March. Available at:

<https://www.mk.co.kr/opinion/columnists/view/2019/03/128955/>. (Accessed: 6 May 2019).

Magdoff, F. and Foster, J.B. (2011). *What every environmentalist needs to know about capitalism: A citizen's guide to capitalism and the environment*. New York: Monthly Review Press.

Marten, G.G. (2010). *Human ecology: Basic concepts for sustainable development*. Routledge.

Ministry of Economy and Finance. (2014). *배출권거래제 기본계획 확정* [Press release]. 28 January. Available at:

http://www.moef.go.kr/nw/nes/detailNesDtaView.do?searchBbsId1=MOSFBBS_000000000028&searchNttId1=OLD_4020294&menuNo=4010100. (Accessed: 25 April 2019).

Ministry of Economy and Finance. (2017). *제2차 배출권거래제 기본계획(안)*. Available at:

http://www.moef.go.kr/com/cmm/fms/FileDown.do?atchFileId=ATCH_00000000003839&fileSn=3. (Accessed 26 April 2019).

Ministry of Environment. (2014a). *국가 온실가스 감축, 2020년 로드맵 마련* [Press release]. 28 January. Available at:

<http://www.me.go.kr/home/web/board/read.do?boardMasterId=1&boardId=339265&menuId=286>. (Accessed: 9 May 2019).

Ministry of Environment. (2014b). *배출권거래제, 1차 계획기간 동안 16억 8700만톤으로 배출권 총수량 확정* [Press release]. 11 September. Available at:

<http://www.me.go.kr/home/web/board/read.do?pagerOffset=0&maxPageItems=10&maxIndexPages=10&searchKey=title&searchValue=1%EC%B0%A8+%EA%B3%84%ED%9A%8D%EA%B8%B0%EA%B0%84&menuId=286&orgCd=&boardId=377150&boardMasterId=1&boardCategoryId=&decorator=>. (Accessed: 25 April 2019).

Ministry of Environment. (2015). *2030년 우리나라 온실가스 감축목표 BAU(851백만톤) 대비 37% 감축으로 확정* [Press release]. 30 June. Available at:

<http://www.me.go.kr/home/web/board/read.do?boardMasterId=1&boardId=534080&me>. (Accessed: 16 April 2019).

- Ministry of Environment. (2018a). *2030 온실가스 감축 로드맵 수정안 및 2018~2020 년 배출권 할당계획 확정* [Press release]. 24 July. Available at: <http://www.me.go.kr/home/web/board/read.do?boardMasterId=1&boardId=886420&menuId=286>. (Accessed: 27 April 2019).
- Ministry of Environment. (2018b). *온실가스 배출권거래제 제2 차 계획기간 국가 배출권 할당계획 2 단계 계획 수립* [Press release]. 31 July. Available at: <http://www.me.go.kr/home/web/board/read.do?boardMasterId=39&boardId=888400&menuId=290>. (Accessed: 2 May 2019).
- Ministry of Environment. (2018c). *배출권거래제 1 기, 배출권 부족 없이 안정적으로 운영* [Press release]. 20 September. Available at: <http://www.me.go.kr/home/web/board/read.do?boardMasterId=1&boardId=911320&menuId=286>. (Accessed: 16 April 2019).
- Ministry of Trade, Industry and Energy. (2017). *17 년 배출권 할당계획 변경 및 제2 차 배출권거래제 기본계획 확정* [Press release]. 24 January. Available at: http://www.motie.go.kr/motiee/presse/press2/bbs/bbsView.do?bbs_seq_n=159017&bbs_cd_n=81. (Accessed: 2 May 2019).
- Mundaca, L., Neij, L., Labanca, N., Duplessis, B. and Pagliano, L. (2008). Market behaviour and the to-trade-or-not-to-trade dilemma in ‘tradable white certificate’ schemes. *Energy Efficiency*, 1(4), pp.323-347.
- National Index System. (2018). *National Greenhouse Gas Emissions Status*. Available at: http://www.index.go.kr/potal/main/EachDtlPageDetail.do?idx_cd=1464. (Accessed: 2 May 2019).
- National Law Information Center. (2019). *Enforcement Decree of the Act on the Allocation and Trading of Greenhouse Gas Emission Permits*. Available at: <http://www.law.go.kr/LSW/eng/engLsSc.do?menuId=2§ion=lawNm&query=emissions+trading+scheme&x=0&y=0#liBgcolor0>. (Accessed: 27 April 2019).
- Newell, P. and Paterson, M. (2010). *Climate capitalism: global warming and the transformation of the global economy*. New York: Cambridge University Press.
- Organization for Economic Co-operation and Development (OECD). (2018). *OECD Economic Surveys: Korea 2018*. Available at: https://read.oecd-ilibrary.org/economics/oecd-economic-surveys-korea-2018_eco_surveys-kor-2018-en#page20. (Accessed: 16 April 2019).
- Paterson, M. (2011). Who and what are carbon markets for? Politics and the development of climate policy. *Climate Policy*, 12(1), pp.82-97.
- Richter, J.L. and Mundaca, L. (2013). Market behavior under the New Zealand ETS. *Carbon Management*, 4(4), pp.423-438.

- Rogers, H. (2010). *Green gone wrong: How our economy is undermining the environmental revolution*. London: Verso.
- Schramm, W. (1971). *Notes on Case Studies of Instructional Media Projects*. Available at: <https://eric.ed.gov/?id=ED092145>. (Accessed: 12 May 2019).
- Shapiro, M. (2019). *The End of Stationarity: Searching for the New Normal in the Age of Carbon Shock*. Translated from Korean by B.-M. Kim. Seoul: Alma Publishing Co.
- Son, Y. (2014). A study for the Issue of the Introduction of the Carbon Emissions Trading Scheme. *InHa Law Review*, 17(4), pp.373-397.
- Stephan, B. and Paterson, M. (2012). The politics of carbon markets: an introduction. *Environmental Politics*, 21(4), pp.545-562.
- Sonnenschein, J. and Mundaca, L. (2016). Decarbonization under green growth strategies? The case of South Korea. *Journal of Cleaner Production*, 123, pp.180-193.
- Today Energy. (2019). 2019년부터 달라지는 배출권거래제 [Press release]. 3 January. Available at: <http://www.todayenergy.kr/news/articleView.html?idxno=210214>. (Accessed: 9 May 2019).
- Vlachou, A. and Pantelias, G. (2017a). The EU's Emissions Trading System, Part 1: Taking Stock. *Capitalism Nature Socialism*, 28(2), pp.84-102.
- Vlachou, A. and Pantelias, G. (2017b). The EU's emissions trading system, Part 2: A political economy critique. *Capitalism Nature Socialism*, 28(3), pp.108-127.
- Winchester, N. and Reilly, J.M. (2018). *The Economic, Energy, and Emissions Impacts of Climate Policy in South Korea*. Massachusetts: Massachusetts Institute of Technology. Available at: https://globalchange.mit.edu/sites/default/files/MITJPSPGC_Rpt328.pdf. (Accessed: 16 April 2019).
- Yin, R. K. (2014). *Case study research: design and methods* (5th edn.). Los Angeles, CA: SAGE.
- Yu, J., Yoo, J.-H., Kim, J. and Lee, C. (2017). The Effectiveness of GHG Abatement Policies in Korea - Examining Changes since the Launch of the ETS. *Journal of Environmental Policy and Administration*, 25(2), pp.231-247.

9. Appendix

Appendix A: Document Analysis – The list of analyzed texts

Organization	Documents Analyzed
Construction Economic Daily	http://ets.energy.or.kr/WEBSITE/download/download_board.aspx?atch_sct=PRESS&no=1&pno=94 . (All last accessed: 9 May 2019)
Energy and Climate Policy Research Institute	http://ecpi.or.kr/epbrd/bbs/board.php?bo_table=bbs6&wr_id=9074 . (All last accessed: 3 May 2019)
Federation of Korean Industries	http://www.fki.or.kr/FkiAct/Promotion/Opinion/View.aspx?content_id=8feebae9-2502-4816-8fe7-8afe99794d97 . http://www.fki.or.kr/Common/Download.aspx?id=8ae77499-f147-4a0d-918f-2b6e39f07cc6 . (All last accessed: 9 May 2019)
Green Korea	http://www.greenkorea.org/?p=40203 . (All last accessed: 4 May 2019)
Institute for Climate Change Action	http://climateaction.re.kr/index.php?document_srl=21557&mid=act01&page=2&npage=2 . (All last accessed: 5 May 2019)
International Carbon Action Partnership (ICAP)	https://icapcarbonaction.com/en/?option=com_attach&task=download&id=493 . https://icapcarbonaction.com/en/?option=com_attach&task=download&id=494 . https://icapcarbonaction.com/en/?option=com_etsmap&task=export&format=pdf&layout=list&systems[]=47 . (All last accessed: 25 April 2019)
International Energy Agency (IEA)	https://www.iea.org/statistics/?country=KOREA&year=2016&category=Emissions&indicator=TotCO2&mode=chart&dataTable=INDICATORS . (All last accessed: 16 April 2019)
Korea Chamber of Commerce and Industry (KCCI)	http://www.korcham.net/nCham/Service/ECONBrief/appl/EconInfoDetail.asp?SEQNO=88080 . (All last accessed: 4 May 2019)
Korea Economic Daily	https://www.hankyung.com/economy/article/2017040579601 . https://www.hankyung.com/economy/article/2018071116901 . (All last accessed: 6 May 2019)
Korean Environmental Justice Institute	http://eco.or.kr/eco2016/wp-content/plugins/uploadingdownloading-non-latin-filename/download.php?id=35898 . (All last accessed: 4 May 2019)
Korean Federation for	http://kfem.or.kr/wp-content/uploads/2010/12/1419319325_eQ9MqX.hwp . http://kfem.or.kr/?p=13740

Environmental Movement	(All last accessed: 5 May 2019)
Maeil Business Newspaper	https://www.mk.co.kr/opinion/columnists/view/2014/07/964231/ . https://www.mk.co.kr/news/business/view/2015/06/593254/ . https://www.mk.co.kr/opinion/columnists/view/2019/03/128955/ . (All last accessed: 8 May 2019)
Ministry of Economy and Finance	http://www.moef.go.kr/nw/nes/detailNesDtaView.do?searchBbsId1=MOSFBBS_000000000028&searchNttId1=OLD_4020294&menuNo=4010100 . http://www.moef.go.kr/com/cmm/fms/FileDown.do?atchFileId=ATCH_000000000003839&fileSn=3 . (All last accessed 26 April 2019)
Ministry of Environment	http://www.me.go.kr/home/web/board/read.do?boardMasterId=1&boardId=339265&menuId=286 . http://www.me.go.kr/home/web/board/read.do?pagerOffset=0&maxPageItems=10&maxIndexPages=10&searchKey=title&searchValue=1%EC%B0%A8+%EA%B3%84%ED%9A%8D%EA%B8%B0%EA%B0%84&menuId=286&orgCd=&boardId=377150&boardMasterId=1&boardCategoryId=&decorator= . http://www.me.go.kr/home/web/board/read.do?boardMasterId=1&boardId=534080&me . http://www.me.go.kr/home/web/board/read.do?boardMasterId=1&boardId=886420&menuId=286 . http://www.me.go.kr/home/web/board/read.do?boardMasterId=39&boardId=888400&menuId=290 . http://www.me.go.kr/home/web/board/read.do?boardMasterId=1&boardId=911320&menuId=286 . (All last accessed: 9 May 2019)
Ministry of Trade, Industry and Energy	http://www.motie.go.kr/motiee/presse/press2/bbs/bbsView.do?bbs_seq_n=159017&bbs_cd_n=81 . (All last accessed: 2 May 2019)
National Index System	http://www.index.go.kr/potal/main/EachDtIPageDetail.do?idx_cd=1464 . (All last accessed: 2 May 2019)
National Law Information Center	http://www.law.go.kr/LSW/eng/engLsSc.do?menuId=2&section=lawNm&query=emissions+trading+scheme&x=0&y=0#liBgcolor0 . (All last accessed: 27 April 2019)
Today Energy	http://www.todayenergy.kr/news/articleView.html?idxno=210214 . (All last accessed: 9 May 2019)

Appendix B: Interview guide

- Interview questions

1) What was the political-economic context that influenced the introduction of the Korean Emissions Trading Scheme (KETS)?

- 2) Has the KETS been effectual for reducing the national GHG emissions since it has been implemented?
- 3) If not, what are the reasons (e.g. social atmosphere, BAU emissions reduction target, flexibilities, allocation of emissions permits, etc.) for causing that problem?
- 4) How has the KETS been operated so far compared to the discussion and recommendation that were made by the numerous groups, such as scholars, researchers, environmental organizations, and private sectors, before the KETS started to be implemented?
- 5) Who has different interests in setting the regulations of emissions permit allocation and flexibilities? How are the regulations of emissions permit allocation and flexibilities set by the different interests of stakeholders?
- 6) Are there any groups that have gotten benefit from utilizing the KETS? If so, what kind of groups are they? Why do you think so?
- 7) What could be the alternative climate policies to the KETS? What could compensate the defect of the KETS?

- 인터뷰 질문 (Interview questions in Korean)

- 1) 한국의 온실가스 배출권 거래제가 어떠한 사회적, 정치적 맥락에서 형성되었는가?
- 2) 한국의 온실가스 배출권 거래제가 시행된 후 지금까지 탄소 배출을 저감하는데 긍정적인 효과가 있었다고 생각하는가?
- 3) 만약 그렇지 않다면 그 원인(e.g. 사회적 분위기, BAU, 할당, 상쇄, 이월 등의 유연성 등)이 무엇이라고 생각하는가?
- 4) 배출권 거래제가 시행되기 이전, 학자, 연구원, 환경단체 등의 다양한 집단에서 배출권 거래제에 대해 논의한 것에 비해서 실제적으로 어떻게 배출권 거래제가 운영되고 있는가?
- 5) 배출권 거래제의 세부 내용 변경이 이루어지는 데 어떠한 이해관계가 작용을 했는가?
- 6) 온실가스 배출권 거래제를 통해서 이익을 보는 집단이 있다고 생각하는가? 만약 그렇다면, 어떤 집단이 이익을 본다고 생각하는가? 그리고 그렇게 생각하는 이유는 무엇인가?

7) 배출권 거래제를 대안, 혹은 보완할 수 있는 방법으로는 어떤 것이 있다고 생각하는가?