

A Countermeasures against climate change in Korea*

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[Abstract]

The global warming brings various kinds of disasters. The intensity of abnormal weather extremes becomes stronger and oftener. To cope with this global warming and climate change, we can try to minimize the outcome from climate change, but we have to also try to get rid of causes of global warming itself, namely to execute mitigation measurement. According to the scientific research, the greenhouse gases cause the climate change and the global warming, therefore the emission of GHG should be diminished urgently.

So far Korea does not take the responsibility to decrease the emission of GHG according to Kyoto Protocol, but the Korean government established such a positive plan to cut 30% of the GHG emissions by 2020 from the

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expected 2020 BAU level of emissions and introduced the emission trading scheme. In this step the government's plan met the opposition from industry side, but the government reached a compromise with the industry through patient dialogues. In this process of GHG emission reduction, the Korean parliament enacted three very important Acts regarding climate change mitigation.

According to the ETS the emission trading has started since Jan. 1, 2015. We hope that this emission trading scheme may contribute to the cutting effort of GHG beginning with Korea to the whole world. I anticipate that we may harmonize step by step interests of the related parties further and take steps toward the reduction of emission of GHG steadily. Regarding ETS the role of local government is very limited, but as to carbon sink it can do many things like designation of green land or ecological area according to the city planning law and the related law, award of subsidy to the activities of parties for reducing effort of GHG etc.

I. Global Warming and Climate Change in Korea

I have considered, what I have to deal with this article, especially regarding countermeasures against global warming and climate change. Professor Kao had suggested that it might be better to deal with multi-level governance of climate change regarding climate change mitigation and adaptation, and I accepted his suggestion willingly. As I tried to deal with two big poles of climate change measures namely 'climate change mitigation' and 'climate change adaptation', I met at first a problem of dividing these two concepts properly and also of finding out the contents of them. These two words, for me, have themselves very complex and vast meaning, and from each of them I can derive so many thinking points considered as countermeasures against climate change. I can imagine all kinds of activities and measures as countermeasures against climate change, e.g. starting

from reduction of carbon-dioxide through shortning of journey or manufacturing, adjustment of land-use planning, renewable energy, to building infrastructures, building a energy efficient house, establishing water supply, improving health and emergency services etc., therefore I thought if I try to deal with all these problems, this paper would be too extensive to write.

Therefore I have chosen one of them, namely climate change mitigation and I will focus on it. Climate change mitigation measures have also various contents in themselves, then I will concentrate on the emission trading system(ETS) of Korea as a measure of 'climate change mitigation', and other contents related this will be handled here and there in a small portion.

Regarding environmental work in Korea, the central government has the authority to regulate according to Art. 39 "Government Organization Act" and sometimes the local government or other entities can take over the work, if the authorities were delegated to them by the central government. Therefore the mitigation measures are usually undertaken by the central government with help of the local government and other parties including citizens. The emission trading scheme is driven mainly by the central government in Korea as a election pledge.

Actually the emission trading mechanism was already regulated in Art. 18 under the "Special Act on Improvement of Metropolitan-area Air Environment" enacted Dec. 31. 2003. But the trading results according to this Act were very rare and undertaken only hundred and dozens of trading cases in 10 years just as showing cases.

After much meandering, Korea has enacted three very important Acts regarding climate change, namely "Framework Act on Low Carbon, Green Growth"(Green Growth Act: GGA), "Act on the Allocation and Trading of Greenhouse-gas Emission Permits"(Emission Trading Act: ETA) and "Act on the Management and Improvement of Carbon Sink"(Carbon Sink Act: CSA). Hereafter I will treat mainly these three acts of Korea regarding climate change mitigation.

Global warming means that the earth becomes warmer through the increase

of temperature of the earth, and nowadays we all accept the global warming as a apparent fact. Since 1800 the earth has become warmer and then the mean temperature of the earth increased 0.8 °C, and among these increases 0.6°C happened after 1980. The global warming triggered the increase of water level, the opening of arctic route because of melting of glacier, the increase of arid area, the increase of weather extremes, the change of growth areas of vegetation etc. The term “climate change” means according to Art. 2 Nr. 7 GGA that the atmosphere deviates from its average conditions due to human activities or natural causes. In Art. 2 Nr. 11 GGA defines also the term “global warming” legally: “The term ‘global warming’ means a phenomenon in which the temperatures of the earth's surface and atmosphere rise additionally throughout the earth as greenhouse gases, generated as a consequence of human activities, are accumulated in the atmosphere to increase the concentration of greenhouse gases.” According to the GGA, the terms ‘climate change’ and ‘global warming’ are limited to the symptoms out of greenhouse gases through the activities of humans.

The global warming brings huge risks not only to ecosystem but also to humans. As we know well, the risks of the global warming are indicated as follows: ① We can not cope with climate change properly because of big variations of weather and climate extremes. ② A flood in one area of the earth brings about drought of other areas of the earth. ③ Because of moisture evaporation out of soil, the desertification takes place rapidly. ④ Rain falls short of especially in the alpine zone. ⑤ Because of melting glaciers, sea level increases. Therefore lower part of the coast will be submerged into water. ⑥ Insects increase and food problem becomes intensified. ⑦ Ecosystem ruined and biodiversity is undermined. ⑧ Frequency of earthquakes will be caused, etc.¹⁾

In Korea the mean temperature between 1908 and 1940 had remained between

¹⁾ Kang, Hyun Ho, *Environmental Law*, 2011, p. 166.

10°C and 11°C, but since 1970 it was 12°C and 13°C. Since 1991 it has been registered 13.5°C. This temperature is higher than that of the world's mean temperature 12°C. We expect that the climate in Korea would be changed rapidly and vegetation dispersion of Korea also might be changed severely. In this stream of climate change the part of BUSAN, the harbour and second biggest city in Korea, would be submerged in 2100. According to the measurement of carbon dioxide in Korea 1991 it was 360.1ppm, 2000 it was 373ppm and 2012 it was higher than 400ppm and reached to 401.2ppm.²⁾

If we can not hinder this trend of increase of temperature, the clause “the pine tree in the Southmountain” in the Korean national hymn should be changed, according to the daily newspaper, because the pine tree can't live in the Southmountain in Seoul due to high temperature.³⁾ Various kinds of insects and diseases happened in the northern area of Korea because of climate change.

II . Korean government's response to climate change

At the level of the international response to global warming, Climate Change Convention(United Nations Framework Convention on Climate Change: UNFCCC) was signed. The main contents of the “Framework Convention on Climate Change” is to create a national report about the status of national greenhouse gas emission, absorption and to establish and enforce a national policy to reduce greenhouse gas emissions etc. For the implementation of the Convention, the first Conference of the Parties (COP) has been held 1st March

2) <<http://news.donga.com/3/all/20101011>>: Report on Climate Change in Korea of National Environmental Science; <<http://www.seoul.co.kr>>: Ha Jong Hoon, Warning of Global Warming; <<http://www.forest.go.kr>>

3) Yunhab News, 2013. 05. 16. Warming Korea; 2013. 05. 23. Warming Korea.

1995. Particularly in December 1997 the third Conference of the Parties was held in Kyoto, Japan, where the Kyoto Protocol was accepted, which set the obligation of the emission reduction targets for the developed countries. According to the Kyoto Protocol on Climate Change, Korea is classified as a Non-Annex I country. Korea can meet the conditions of the Kyoto Protocol, if it establishes a national strategy to reduce greenhouse gas emissions on their own, and to write a national report and to submit to the Conference of the Parties (Conference of the Parties: COP).⁴⁾

Korea had already made rules regarding climate in Art. 9 Clean Air Conservation Act: The Government shall participate positively in international efforts, such as the exchange of environmental information and technologies with other nations, and devise policies for research and surveys, recovery and recycling, development of substitutes, etc. for the reduction of emissions of climate/ ecosystem-changing substances. Because Korea can not continue to stay on the lower level regarding climate change, it was deemed desirable to deal with the issue of climate change more positively to prepare for the future and to let all sectors of industries including steel, automobile, transportation etc. strive to switch to energy-efficient construction. so that Korea plays a leading role in the climate system.

January 7, 2005 the Ministry of Environment and the Federation of Korean Industries suggested jointly in the corresponding seminar with the United Nations Framework Convention on Climate Change, Kyoto Protocol, that the Minister would actively review the enactment of the “Climate Change Basic Law”. August 22, 2007 the New Strategy to cope with the climate change was announced in the national energy committee meeting chaired by the former President Roh Moo-hyun.⁵⁾ More positive response to climate change happened in the

4) Kang, Hyun Ho, *ibid*, p. 28; Kim, Yong gun et. al, *Domestic Greenhouse Gas Emissions Trading Schemes*, 2003, p. 1; <<http://me.go.kr/kor/notice>>.

5) <<http://news.mk.co.kr>>: Mail Economy, 2007. 08. 22. Editorial: Climate Change, Don't

government of the former President Lee Myung-bak in 2008. Lee's government considered 'Green Growth' as a new national development strategy and took climate change issue as a topic of national competitiveness. In the celebrating speech of the Korean Independence Day August 15, 2008 the President Lee Myung-bak formed "Low Carbon, Green Growth" as a new paradigm for smart growth strategies to cope with the dual crises of climate change and higher oil prices. He proclaimed the year 2008 as "the first year of going to a low-carbon society" and announced this following plans namely "The first national energy master plan (2008-2030)", "The climate change response comprehensive master plan (2008-2012)", "The third renewable energy technology development, dissemination and use basic plan(2009-2030)" and "Low carbon, green growth three strategies and 10 agendas".

And Lee's government enacted the "Framework Act on low Carbon, Green Growth" to support national issues for promoting low-carbon green growth from the point of legal aspects. In this trend Lee's government has announced a reduction target of greenhouse gas emissions. This target means to reduce 30% of GHG emissions by 2020 from its business-as-usual(BAU) emissions.⁶⁾ 13 ministries had issued together the "national climate change adaptation plan" in December 2008, and July 1, 2009, the 'National Climate Change Adaptation Centre' was established to prepare the climate change adaptation measures. January 13, 2010 the minister of environment announced to establish a 'national climate change adaptation measures(2011-2015)' based on "Framework Act on low Carbon, Green Growth". In order to achieve the 30% reduction by 2020 from the expected 2020 BAU level of emissions, the 'greenhouse gas and energy target management' was conducted. Through the target management mechanism of the GHG emissions, the "System of Measurement, Reporting and Verification(MRV)" was built and also the national greenhouse gas inventory

Stand Behind!

⁶⁾ This reduction amount is measured on the basis of emissions in 2020.

was drawn up to the international level. In May 2012, the Act on the Allocation and Trading of Greenhouse-Gas Emission Permits was enacted and from 1. Jan. 2015 the emission credit trading was launched. The Korean government set forth various plans to lower the emission of greenhouse gases; for example expansion of nuclear power(27.8% of primary energy by 2030, 59% of electricity generation share), expansion of renewable energy (11% of 2030 primary energy), introduction of Renewable Portfolio Standard(RPS), the Building of one Million Green Home and the obligatory use of renewable energy in new buildings etc.

The Lee Government emphasized the importance of climate change adaptation and one of the adaptation measures Green New Deal projects so-called “Four-Rivers-Project” was promoted. Due to climate change, water scarcity would be anticipated and flood damages would be intensified, therefore the new construction of 16 dams was started as the core content of the “Four-Rivers-Project” in order to prepare this problem. The Korean Government set the goals of the “Four Rivers Project” in Four Rivers Project Master Plan, released in 2009, as following: “Climate Change Preparation, Symbiosis of Nature and Humans, Recreation of Land, Establishment of the Base of balanced regional development and green growth.”

These efforts of the Korean government have been recognized internationally, and the United Nations Environment Programme (UNEP) suggested that the case of South Korea was the outstanding example of the efforts to respond to climate change. The global research firm “Accountability” has also announced the “National Climate Competitiveness Index(CCI) and Korea was selected as the most dynamic and leading national group in climate change analysis with Germany and China among the investigated 95 countries.⁷⁾

Hereafter there is a chronological table regarding the Korean government's response to climate change.

7) <<http://news.mk.co.kr/newsRead.php?year=2010&no=204437>>.

[Table 1] Korean government's response to climate change

2002. 11. 8.	Ratification of the Kyoto Protocol
2005. 1. 7.	United Nations Framework Convention on Climate Change, Kyoto Protocol, corresponding seminar (MOE) Review of the Framework Act on low Carbon, Green Growth
2007. 8. 22.	National Climate Change Strategy announced at the National Energy Committee Meeting
2008. 8. 15.	Motto: Low Carbon Green Growth
2008. 12.	Comprehensive National Climate Change Adaptation Plan
2009. 7. 1.	National Climate Change Adaptation Center
2010. 1. 13.	Framework Act on low Carbon, Green Growth National Climate Change Adaptation Measures(2011-2015), Greenhouse gas and energy target management practice
2012. 2. 22.	Act on the Management and Improvement of Carbon Sink
2012. 5. 14.	Act on the Allocation and Trading of Greenhouse-gas Emission Permits
2014. 9. 2.	Determination of the emissions trading scheme implementation
2014. 9. 11.	Confirmation of Emission Allocation Plan First Reduction Plan Period Total Emission Unit: 1,687,000,000 KAU(= 2015: 573,460,000 KAU+2016: 562,180,000 KAU+2017: 550,900,000 KAU(Korean Allowance Unit)) Selection of 526 companies

III. Countermeasures against climate change

The International Panel on Climate Change(IPCC) has developed two important concepts regarding countermeasures against climate change, among them the one is Mitigation of Climate Change and the other is Adaptation of Climate Change. IPCC defines in its homepage these notions as follows:

Mitigation is “an anthropogenic intervention to reduce the sources or enhance the sinks of greenhouse gases”, and the adaptation is “Adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities. Various types of adaptation can be distinguished, including anticipatory and reactive adaptation, private and public adaptation, and autonomous and planned adaptation.”⁸⁾ http://climateknowledge.org:16080/figures/WuGblog_figures/RBRWuG0049_IPCC_Glossary.pdf

1. Mitigation of Climate Change

Climate change mitigation means a measure to restrict or suspend climate change itself or to improve this station. In other words climate change mitigation prevents climate change from occurring and supports expanding the greenhouse gas sinks or sources of anthropogenic intervention to reduce the greenhouse gases fundamentally. Climate change mitigation may typically include carbon emissions trading scheme. According to the IPCC the ability of mitigation can be decided by the factors as follows: technical alternatives to alleviate the emissions of greenhouse gases, policy measures, decision-making authority and institutions, distribution and availability of resources, human capital including education, social capital, access to risk dispersion mechanisms, decision-makers, and information management skills etc.⁹⁾

To exercise the mitigation measures of climate change, it is strongly recommended to use a public transportation system or a bike instead of driving a car, to produce energy efficient cars like clean diesel cars or electric cars,

⁸⁾ The International Panel on Climate Change (IPCC): <http://climateknowledge.org:16080/figures/WuGblog_figures/RBRWuG0049_IPCC_Glossary.pdf>.

⁹⁾ <http://www.grida.no/publications/other/ipcc_tar>: Climate Change 2001: Working Group II: Impacts, Adaptation and Vulnerability.

and to suppress the generation of greenhouse gases through using renewable energy(solar energy, tidal power, wave power, wind power, hydrogen energy, bio-energy) and to lower the use of energy through smart building systems, and to designate many carbon sinks since the establishment of land use plans. As one of this climate change mitigation, the emission trading scheme is considered.

2. Adaptation of Climate Change

Climate change adaptation begins with the assumption that the adverse effects of climate change appear surely and, therefore we have to just minimize the risks associated with climate change and to prepare response measures efficiently utilizing the opportunity to change the climate change into best chances and at the same time to limit the harmful effect of the climate change. In other words, climate change adaptation measures try to mitigate damages, which seem to occur currently or in the future, through the control of influences and effects of climate change, and to promote profitable opportunities. The adaptation here is mainly focused on the limitation of the impact on our culture and lives of human beings, not on impacts on ecosystems and the environment itself.

The ability to cope with the impacts of climate change, according to the IPCC, is determined by financial resources, institutional capacity, social capital, human capital, and technological alternatives. As practically important problems as to adaptation of climate change will be considered problems like food shortage, water shortage, heavy rains or drought, disease management issues. As measures to cope with the climate change adaptation would be suggested these methods like developing crops well adapted to the changed climate, including strong rice to natural disasters, building dams against the flood, prohibiting construction in flood risk areas, and preserving of wetlands such as buffer zones, using of rainwater to be prepared for drought, and establishing water management system, water conservation system, re-use of water resources, land use planning, which

leads to efficient planting etc. In order to strengthen the management of the disease, the control system over sensitive diseases and communicable diseases should be surveiled and the sanitary environment should be improved.

3. Integration of mitigation and adaptation

Climate change mitigation and adaptation are often recognized as a separate policy area, but in practice, they are very closely connected. Mitigation of climate change impacts on the cost of adaptation through delaying or reducing the climate change effects, and vice versa the climate change adaptation contributes to the climate change mitigation. They stand each other in the complementary relationship that will help to reduce the damage caused by climate change.

However, it is necessary to consider the interactions of adaptation and mitigation for deriving the policy priority, because there can be conflicts between mitigation and adaptation elements. In contrast to the mitigation measures, which prevent indirectly the damages of climate change, the adaptation measures stop directly damages from climate changes. Mitigation policy and adaptation policy take a different approach from viewpoint of time and space. The mitigation measures need time to take effect after executing various means, and sometimes they need the help of other countries. In contrast to them, the adaptation measures become effective in relatively short time and also in the specific area.

And adaptation and mitigation measures of climate change have different related parties in the decision-making process and also different policy target. Mitigation measures are adapted normally to the interests of future generations, while adaptation measures will focus on reducing the impact of the current generation. Mitigation measures are focusing on greenhouse gas emitters that cause climate change, but adaptation measures emphasize the symptoms which occur by the climate change. The main parties interested to the mitigation policies are those who consume energy resources in large quantities like transport,

electricity and industry area. The stakeholders related in adaptation measures are very comprehensive ranging from individual farmers to the central government, therefore the adaptation measures are very complex. The mitigation measures are mostly international, but the adaptation measures are usually in local level, therefore there might be a big difference in the governance system.

Because mitigation actions to reduce the generation of greenhouse gases will contribute also to reduce the frequency and intensity of climate change damages by reducing the rate and magnitude of climate change, therefore the mitigation and adaptation measures stand in a complementary relationship in spite of several differences. It would be desirable that climate change policy should be propelled to exert synergies and to avoid mutual conflicts between climate change mitigation and adaptation.¹⁰⁾

IV. Climate Change Mitigation Measures of the korean government

As mitigation measure of the korean government against climate change, we can find out at first the enactment of three important acts, namely, Green Growth Act, Emission Trading Act and Carbon Sink Act. Hereafter I will deal with the contents of the acts.

1. Green Growth Act(GGA)

The purpose of this Act is to promote the development of the national economy by laying down the foundation necessary for low carbon, green growth and by

¹⁰⁾ Ko, Jaekyung/Kim, Heesun, A Preliminary Study on Integration of Climate Change Mitigation and Adaptation, *Environmental Polity*, Vol. 21, Nr. 1, 2013, p. 30.

utilizing green technology and green industries as new engines for growth, so as to pursue the harmonized development of the economy and environment and to contribute to the improvement of the quality of life of every citizen and the take-off to a mature, top-class, advanced country that shall fulfill its responsibility in international society through the realization of a low-carbon society.¹¹⁾

(1) Meaning of Green Growth

What does the Green Growth mean? According to Art. 2 Nr. 2 GGA, the term “green growth” means growth achieved by saving and using energy and resources efficiently to reduce climate change and damage to the environment, securing new growth engines through research and development of green technology, creating new job opportunities, and achieving harmony between the economy and environment.

Regarding green growth the central government has to do many things, because the GGA authorizes the central government to initiate climate change measures. The central Government should establish and enforce the national green growth strategy. This national strategy for green growth includes the following matters:

1. Matters concerning the realization of the green economic system;
2. Matters concerning green technology and green industries;
3. Matters concerning policies for coping with climate change, policies on energy, and policies on sustainable development;
4. Matters concerning the green life, the green homeland and the low-carbon traffic system;
5. Matters concerning international negotiations and cooperation in relation to low carbon, green growth, including climate change;

¹¹⁾ Art. 1. GGA.

6. Other matters considered necessary for low carbon, green growth, including procurement of financial resources, taxation, financing, training of human resources, education, and public relations activities.¹²⁾

GGA regulates basic principles for coping with climate change, which the Government follows in establishing and implementing climate change strategies, e.g. the recognition of the seriousness of the problems of climate change, the establishment of the State's medium and long-term targets, the development of climate technology, the preparation of the carbon market system and the preparation of climate adaptation measures.¹³⁾

The Government establishes and implements a basic plan every five years for coping with climate change for a planning period of 20 years in accordance with the basic principles for coping with climate change.¹⁴⁾ The basic plan for coping with climate change should include tendency and forecast of domestic

¹²⁾ Art. 2. Paragraph 2. GGA.

¹³⁾ Article 38. GGA.

1. It shall recognize the seriousness of problems of climate change ensuing from global warming, cope with such problems comprehensively by putting together capacities of the State and citizens, and participate in global efforts actively;

2. It shall establish the State's medium and long-term targets for the reduction of greenhouse gases by analyzing costs of and benefits from the reduction of greenhouse gases in the economic aspect and taking domestic and overseas conditions into consideration and promote the reduction of greenhouse gases efficiently and systematically by introducing a cost-effective, reasonable regulation system based on pricing functions and market system;

3. It shall develop and utilize high technology and convergence technology, such as technology for information and communications, nanotechnology, biotechnology, to reduce greenhouse gases drastically;

4. It shall enable to adopt various means for reduction autonomously by clarifying rights and obligations in connection with the emission of greenhouse gases and allowing transactions of such rights and obligations in the market and shall be prepared for the international carbon market by boosting the domestic carbon market;

5. It shall be prepared against natural disasters on a large scale and changes in environmental ecosystem and the status of crops, minimize impacts of climate change, and protect the safety and property of citizens from such dangers and disaster.

¹⁴⁾ According to Article 40. (Basic Plan for Coping with Climate Change) Paragraph 1. GGA.

and overseas climate changes, current status and outlook of the emission, establishment of medium and long-term targets for the reduction of emission of greenhouse gases and international cooperation etc.¹⁵⁾

As a countermeasure of climate change mitigation, the Government may operate a system for trading emissions of greenhouse gases by utilizing market functions and the emission trading system should include a system for setting a cap on emission of greenhouse gases.¹⁶⁾ The central government has to consider international negotiations related to climate change and take necessary measures in relation to controlled entities, if international competitiveness is likely to be degraded significantly.

Regarding the method of allocation of the allowable quantity of emission, the methods of registration and management, and the establishment and operation of an exchange for implementing the system, ETA can be enacted.

In Korea according to GGA, the Government is empowered to do many things to mitigate climate change, e.g. to improve the ability to observe and forecast climate information, to utilize weather phenomena, to analyze and assess potentials continuously to secure new and renewable energy sources, to support for related specialized institutions, and to research and analyze the status of changes in biomass and water resources.¹⁷⁾

Each local government has to fully cooperate in the State's measures for realizing low carbon, green growth and take into consideration local characteristics and conditions of the local government. Each local government has to comprehensively consider impacts of its plans and projects on climate change and seek for measures necessary for encouraging activities of business entities, residents, and non-governmental organizations for low carbon, green

¹⁵⁾ Art. 40. Paragraph 3. GGA.

¹⁶⁾ According to Article 46. (Introduction of Cap and Trade System) Paragraph 1. GGA.

¹⁷⁾ According to Article 48. (Assessment of Impacts of Climate Change and Implementation of Measures for Adaptation) Paragraph 1. GGA.

growth, such as providing them with information and financial support.¹⁸⁾ Regarding green growth the local government are covered by many obligations, which were imposed by GGA.

(2) Target Management System of GHG and Energy

Greenhouse gas and energy target management sets goals in a permissible level of greenhouse gas emissions and energy consumption and manages the emission of greenhouse gases and the usage of energy within the fixed scope.

The Government has to establish medium and long-term targets and seek for measures necessary for accomplishing the targets in order to cope with the global reduction of greenhouse gases actively and to promote low carbon, green growth efficiently and systematically:

1. Targets for the reduction of greenhouse gases;
2. Targets for energy saving and targets for efficiency in the use of energy;
3. Targets for self-sufficiency in energy;
4. Targets for the supply of new and renewable energy.¹⁹⁾

The Government can request appropriate informations from central administrative agencies, local governments, and public institutions in order to establish targets for energy saving and targets for the reduction of greenhouse gases for each agency, local government or institution and the Government can also provide guidance and supervise over their performance, in order to accomplish targets. The Government can establish targets for each sector, such as industries, traffic, transportation, household, and commerce and prepare

¹⁸⁾ Art. 5(Responsibilities of local Governments) GGA.

¹⁹⁾ According to Article 42. (Coping with Climate Change and Management of Targets for Energy) Paragraph 1. GGA.

measures necessary for accomplishing such targets. By establishing the target, the Government discusses with other legal subjects in order to take into consideration various situations.

In order to carry out the target management system, the estimation of inventory of greenhouse gases and energy should be done at first. After that estimation the target company, on which the target management system will be applied, should be selected. And then the target company should be managed by the management operating procedures.

(a) Measurement of Inventory of GHG

According to IPCC Guidelines, the National Greenhouse Gas Estimation Guideline which is internationally accepted, has been established for the national greenhouse gas inventory estimation.²⁰⁾ The determination of national greenhouse gas emissions are undertaken through three-steps, the first step, calculating and reporting step, the second step, emissions verification step, and the third step, emissions confirmation step. The calculated GHG are 6 GHG of the Kyoto Protocol, namely CO₂, CH₄, N₂O, HFCs, PFCs, SF₆, and the calculation unit is converted to CO₂eq.(Carbon Dioxide Equivalent Units).

(b) Target Company

According to the GGA, the Enforcement Decree of the GGA and according to the guidance on operation of greenhouse gas and energy target management²¹⁾, those business entity and its place of business, which emit large amounts of greenhouse gases or consume large amounts of energy become target company of the Target Management System. The designation criteria of the management company as business entity and its place are as follows: 1. A business entity whose average total quantities per year of greenhouse gases emitted from and

²⁰⁾ www.gir.go.kr/

²¹⁾ Revised 5/11/2012, Ministry Announcement No. 2012-211.

energy consumed in all its places of business during the latest three years as of January 1 of the pertinent year meet all standards in the following table;
 2. A business entity's place of business in which average total quantities per year of emissions of greenhouse gases and consumption of energy during the latest three years meet all the standards in the following table.²²⁾

[Table 2] Business entity's place of business

	2010~2011		2012~2013		After 2014	
	Business entity	Business entity's place of business	Business entity	Business entity's place of business	Business entity	Business entity's place of business
GHG Emission (CO ₂ -eq ton)	over 125,000	over 25,000	over 87,500	over 20,000	over 50,000	over 15,000
Energy Consumption (Tera Joule)	over 500TJ	over 100TJ	over 350TJ	over 90TJ	over 200TJ	over 80TJ

Based on such criteria about 470 companies are designated as greenhouse gas energy target management company, and through this designation more than 60% of total greenhouse gas emissions can be systematically managed. If we divide companies according to sector, the designations are as follows: industry and development sector: 374 companies, buildings and traffic sector: 46 companies, agriculture and animal husbandry sector: 27 companies, and waste sector: 23 companies.

(c) Process of Target management system

A greenhouse gas, energy target management operation procedures can be

²²⁾ According to Art. 29. (Standards for Designation of Controlled Entities) Paragraph 1. GGA.

divided into the following four steps: the first step, specifying a management company, the second step, submission of reduction target implementation plan, the third step, the submission of fulfillment performance and the fourth step, performance evaluation and improvement command.

(3) Legal challenge against the designation of target company

In the Korean legal system especially in the administrative litigation the legal character of the designation is very important, because the Korean Administrative Litigation Act rules the administrative act as the target of litigation. Unless the designation is qualified as administrative act, then the lawsuit will be dismissed. Not yet such kind of litigation happened, but later it will surely happen. According to my opinion the legal character of the designation can be classified as an administrative act, because it puts the target company legal obligations such as notice, keeping the limit of emission etc.²³⁾

2. Emission Trading Act(ETA)

(1) Disputes regarding enforcement of emission trading

September 11, 2014 the government decided in the National Council the 'national emissions allocation plan', in order to finally implement the emissions trading scheme from Jan. 1, 2015. Hereinafter 526 companies, which have to undertake the ETS, were designated, and among them about 240 business entity would be subject to ETS and about 280 business entity's place of business would be subject to ETS. Total allowable emissions are divided into five categories and 23 sectors. Each sector has the following allowances: power generation and energy sector(730,850,000 KAU), steel(305,760,000 KAU), petrochemicals

²³⁾ Kang, Hyunho, Administrative Law I, 2012, p. 555.

(143,700,000 KAU), cement(128,000,000 KAU), oil(56,000,000 KAU), water, waste industry(28,487,797 KAU), building and communication sector(20,901,359 KAU), aviation industry(3,793,471 KAU).²⁴⁾

The Federation of Korean Industries (FKI), representing the business community, argued that the designated companies either pay huge fines if the greenhouse gas emissions trading starts, or they are forced to relocate plants overseas in the next year. Thus, 23 economic groups asked the government to slow down the implementation time of the Emissions Trading Scheme after 2020. Especially when the ETS begins, the branch of steel would be expected to get a severe blow and to worry about even corporate survival. A CEO of steel company argued that policy makers are unaware of the industry.²⁵⁾ A member of Parliament, Mr. Lee, as a member of the National Assembly and a member of Congressional Committee of industry, trade and resources, submitted an amendment to the ETA, because this act do not distinguish direct emissions and indirect emissions, therefore this act regulates the emitted GHG double times.²⁶⁾ In a recent media report of Korea, the report “EU ETS Myth Busting” was translated into korean language and some people argued that emissions trading system might be failure. Nevertheless, emissions trading system started from January 1, 2015, and the korean government undertakes mock trading three times in order to find out various problems in executing the emission trading system. Till Nov. 7. 2014 the first mock trading was undergone and 375 target companies of the total 536 companies took part in this mock trading.²⁷⁾

(2) Main Contents of ETA

²⁴⁾ <<http://www.fnnews.com>>: Jung, Jiwoo, 2014. 09. 11; Money Today: Kim, Hoonnam, 2014. 09. 12.

²⁵⁾ Hankuk Economic Newspaper, 2014. 08. 11; DongA Newspaper, 2014. 08. 22: Editorial: Starting ETA, Starting Emigranting of Factories.

²⁶⁾ <<http://www.iusm.co.kr/news/articleView.html?idxno=474156>>

²⁷⁾ <<http://www.etnews.com/20141110000266>>

The purpose of this ETA is to achieve national targets for reducing greenhouse gas effectively by introducing a system for trading greenhouse-gas emission permits through market mechanisms.²⁸⁾ Here ‘emission permit’ means an amount of greenhouse-gas emissions permitted and allocated to an individual business entity producing greenhouse gases within the scope of total allowances set for greenhouse gas emissions.²⁹⁾ ‘Commitment period’ means a period set to allocate emission permits to business entities producing greenhouse gases and to manage their outcomes of compliance every five years in order to achieve national greenhouse-gas reduction targets. ‘Compliance year’ means each year during a commitment period set to allocate emission permits to business entities producing greenhouse gases and to manage their outcomes of compliance every year in order to achieve national greenhouse-gas reduction targets for the commitment period. The term ‘one ton of comparable CO₂ equivalents (tCO₂-eq)’ means one ton of carbon dioxide. When the Government establishes or implements a system for the allocation and trading of emission permits, it has to comply with the fundamental principles e.g. the consideration of international standards, the impact of an emissions trading system on the international competitiveness of economic sectors and the fair trading of emission permits.³⁰⁾ There are discussions about the legal character of the emission permits, whether they might be qualified as a right of property.³¹⁾

The competent authority should keep emission permits in reserve at a certain ratio of all emission permits for a commitment period, to allocate emission

²⁸⁾ According to ETA Article 1 (Purpose).

²⁹⁾ According to Article 2 Nr. 3. of ETA.

Kang, Hyun Ho, *Environmental Law*, 2011, p. 173: the legal character of emission permits is to be qualified as a property right.

³⁰⁾ According to the Article 3 (Fundamental Principles) ETA.

³¹⁾ See Kang, Hyun Ho, A Legal Study on the definition and character of the emission right, *Environmental Law Review*, Vol. 33, Nr. 1, 2011, p. 43; Kang, Hyun Ho, A Legal Study on the trading system of carbon emission right, *Environmental Law Review*, Vol. 32, Nr. 2, 2010, p. 100.

permits to new entrants and the additional allocation of emission permits for market stabilization.³²⁾

When a business entity eligible for allocation holds or acquires greenhouse gas reductions generated from an external project in compliance with international standards, it may request the competent authority to convert all or some of such reductions into emission permits.³³⁾

If emission permits surrendered by a business entity eligible for allocation are less than greenhouse gas emissions certified, the competent authority may impose a penalty surcharge not exceeding three times the average market price of emission permits for the pertinent compliance year on the business entity within the maximum 100,000 won per ton of carbon dioxide for the shortfall.³⁴⁾

According to Art. 4 ETA, the central Government shall gather opinions from relevant central administrative agencies, local governments, and interested parties, when the Government intends to establish or revise a master plan. Regarding to ETA, there is almost no room for the local government to engage in the matter, and the local government can only submit opinion in relation to establishment or revision of the master plan. This happens because the regulation related to the ETS should be regulated nationwide in a same standard.

(3) Legal Disputes regarding ETA

According to the newspaper the petrochemical industries will file up lawsuit against the allotment of emission permit to them, after the oil industries filed up lawsuit. The reason why they filed up lawsuit is that the amount of allotment of emission permits is too few to accept. Herewith the legal character of the

³²⁾ According to the Article 18 (Emission Permits in Reserve): In the first period, the amount of emission permits in reserve is 89,000,000 KAU.

³³⁾ According to the Article 29 (Offset) Paragraph 1.

³⁴⁾ According to Article 33 (Penalty Surcharges) Paragraph 1.

allotment of emission permit will be discussed, because the acceptance of the lawsuit depends on it. According to the decision of the Korean administrative court the legal character will be clarified as an administrative act, which will be the target of the administrative litigation.³⁵⁾ But more important thing is the legal character of the ‘national emissions allocation plan’, whether it’s legal character can be qualified as an administrative act. The precedent of the Korean court denied the legal character of such master plan as an administrative act, because it has no concrete and direct influence on the right of the citizen.³⁶⁾

The emission trading scheme may bring out so many legal disputes, because the ETA allows the administrative agencies to intervene in the carbon market in the way of enlarging the number of the emission permits, when they think it is necessary.

The litigation from the third party might be possible, if the amount of the allotment of emission permits is more than anticipated, because the third party also has a deep interest in the allotment. According to the precedent of the court the raise of lawsuit of the third party is permissible, when the third party had a legally protected interest in the lawsuit.³⁷⁾

3. Carbon Sink Act(CSA)

(1) Importance of Carbon Absorption and Carbon Offset

According to the “Korea Forest Research Institute”, it makes research to

³⁵⁾ Kang, Hyun Ho, “A Legal Study on the definition and character of the emission right”, *Environmental Law Review*, Vol. 33, Nr. 1, 2011, p. 70; Korean Supreme Court, 2010. 11. 18. 2008DU167.

³⁶⁾ Korean Supreme Court, 2011. 4. 21. 2010MU111.

³⁷⁾ Kang, Hyun Ho, *Administrative Law I*, 2012, p. 79; Kang, Hyun Ho, A Legal Study on the trading system of carbon emission right, *Environmental Law Review*, Aug. 2010, Vol. 32, Nr. 2, 2010, p. 119; Korean Supreme Court, 2008. 3. 27. 2007DU23811.

identify sources of greenhouse gas removals and develops carbon absorption coefficient. The Institute tries to calculate carbon absorption coefficient of the trees growing in the subtropical areas like “*Castanopsis cuspidata* var. *sieboldii* Nakai” and “*Quercus acuta*”. As a result of the absorption calculation study, annual CO₂ uptake of “*Castanopsis cuspidata* var. *sieboldii* Nakai” reaches 8.49 tCO₂/yr/ha, annual CO₂ uptake of “*Quercus acuta*” was found to be 7.89 tCO₂/yr/ha. In other words, “*Castanopsis cuspidata* var. *sieboldii* Nakai” can offset the yearly GHG emission of 3.5 mid-size cars, and “*Quercus acuta*” is enough to offset the yearly GHG emission of 3.3 mid-size cars. There was also found that the total CO₂ storage capacity of “*Castanopsis cuspidata* var. *sieboldii* Nakai” and “*Quercus acuta*”, which exist in the whole area of Korea, conform to in each 17,856 tCO₂/ha and 5,234 tCO₂/ha, which corresponds to the amount of CO₂ emissions from 9,502 mid-size cars yearly.³⁸⁾

(2) Main contents of CSA

The purpose of this Act is to respond to climate change by managing and improving the role of forests as carbon sinks pursuant to Article 55 GGA and to contribute to the realization of a low carbon society.³⁹⁾ Here are some important concepts regarding CSA for example ‘revegetation’, ‘carbon sink’ and ‘forest carbon offset’ etc. “Revegetation” means artificial activities aimed at increasing forest carbon stock on a site by creating vegetation, neither by afforestation nor reforestation.⁴⁰⁾ “Carbon sink” means above and below ground vegetation(standing trees), bamboo, dead organic matter, soil, harvested wood products, or forest biomass energy in which carbon is absorbed and stored. “Forest carbon offset” means using forest carbon stock for reducing greenhouse

³⁸⁾ <<http://www.korea.kr/policy>>

³⁹⁾ According to Article 1. (Purpose) CSA.

⁴⁰⁾ According to Article 2. Nr. 5. CSA.

gas emissions.

It is also very important to restore through afforestation. The Minister of Korea Forest Service⁴¹⁾ should perform afforestation, reforestation, revegetation, or forest management to manage and improve carbon sinks or he/she may provide a business entity with necessary technical support, etc. when it intends to voluntarily perform such activity.⁴²⁾

The Minister of Korea Forest Service should build an infrastructure for forest carbon offset in order to utilize forest carbon stock that is additionally secured by the heads of local governments or business entities through activities aimed at managing and improving carbon sinks. In this forest carbon offset there are two types according to the purpose of offset, the one is forest carbon offset based on reductions and the other is forest carbon offset based on social contributions. For the forest carbon offset based on reductions, internationally accepted standards should apply so that the heads of local governments or business entities, who are obligated to reduce greenhouse gas emissions under any other Act or regulation, can use forest carbon stock to offset their required greenhouse gas emissions reduction target. For the forest carbon offset based on social contributions, relaxed standards prescribed by Presidential Decree should apply where the heads of local governments or business entities intend to manage and improve forest carbon sinks voluntarily to contribute to society.⁴³⁾

The heads of local governments or business entities, who intend to implement forest carbon offset, should prepare a project design document, and other relevant documents specified by Ordinance of the Ministry of Agriculture, Food and Rural

41) <<http://english.forest.go.kr>>: The Korea Forest Service has the overall responsibility for establishment and implementation of forest policies and laws. The KFS consists of 5 bureaus, 25 divisions, 5 Regional Forest Services and 27 National Forest Stations. It also has affiliate agencies like the Forest Aviation Headquarters, the Korea Forest Research Institute, the National Arboretum, and the National Recreation Forest Office. Each province and metropolitan city have their local forestry administrative organizations.

42) According to Article 9. (Afforestation, etc.) Paragraph 1. CSA.

43) According to Article 19. (Forest Carbon Offset) Paragraph 1. CSA.

Affairs and should submit them to the Minister of the Forest Carbon Center.⁴⁴⁾

The Minister of Korea Forest Service and the head of each local government should encourage public institutions, private organizations, enterprises, and citizens to autonomously and proactively engage in various activities that reduce greenhouse gas emissions by managing and improving carbon sinks and should support measures necessary therefor.⁴⁵⁾ This kind of action can be done by local governments voluntarily. When the Minister of Korea Forest Service formulates or revises the comprehensive plan, he/she should consult, in advance, with the head of local government and request him to submit materials or to provide cooperation as necessary for formulating and implementing a master plan.⁴⁶⁾

The heads of local governments or business entities whose forest carbon offset projects are registered should periodically monitor forest carbon stock in accordance with the operating standards and should submit a report on the outcomes thereof to the head of the Forest Carbon Center.⁴⁷⁾ The Minister of the Korea Forest Service or the heads of local governments may provide business entities with financial and administrative support, such as granting incentives for their activities aimed at managing and improving carbon sinks.⁴⁸⁾

(3) Legal disputes regarding CSA

It is very important from the viewpoint of legal approach, what kind of legal character the registration of carbon offset has, because the possibility to file up lawsuit depends on it. The person related can file up lawsuit against the

⁴⁴⁾ Art. 19 Paragraph 2. CSA.

⁴⁵⁾ According to Art. 3. Paragraph 4. CSA.

⁴⁶⁾ Art. 5. (Formulation, etc. of Comprehensive Plans for Improvement of Carbon Sinks) Paragraph 3. and 4. CSA.

⁴⁷⁾ Art. 20. (Monitoring and Verification of Forest Carbon Stock) Paragraph 1. CSA.

⁴⁸⁾ Art. 32. (Support to Activities Aimed at Managing and Improving Carbon Sinks) Paragraph 1. CSA.

registration of carbon offset or the denial of the registration.

V. Main Organizations for Climate Change

1. National Climate Change Adaptation Center

July 1, 2009, “National Climate Change Adaptation Center” was established in Korea Environment Institute(KEI). The Center aims to harmonize climate change mitigation measures and climate change adaptation measures in the countermeasure against climate change. The Korean government developed a “national climate change adaptive comprehensive plan” to cope with climate change. This plan contains to build a safe community and to support green growth through climate change adaptation. The primary goal of the center is to specialize in researching national climate change adaptation, to support a national climate change adaptation policy, and to establish a climate change adaptation information and network hub.⁴⁹⁾

2. National GHG Information Center

June 2010 the Korean government launched “the national greenhouse gas comprehensive information center” and in this center there was also installed “the committee of national greenhouse gas statistics and management”. This center drew and submitted the third national reports according to the UNFCCC. And it provided guidelines for the monitoring plan in preparation for emissions trading and conducted a research for the improvement of the national greenhouse gas emissions, reporting, verification(MRV). The main purpose of establishing

⁴⁹⁾ <<http://ccas.kei.re.kr/main2014/main.do>>

of “the national greenhouse gas comprehensive information center” is to manage the GHG information comprehensively and efficiently, to respond to climate change through reducing of greenhouse gases, and further to establish a framework for international cooperation on climate change.

Five core functions of the center are as follows: first, operating world-class comprehensive national GHG information management system, second, supporting the target setting of the country-specific greenhouse gas reduction, third, expanding its international cooperation for global greenhouse gas emissions, forth, supporting greenhouse gas energy target management, and fifth investigating and studying the reduction of greenhouse gas emissions at home and abroad.⁵⁰⁾

VI. Conclusion

The global warming brings various kinds of disasters. The intensity of abnormal weather extremes becomes stronger and oftener. To cope with this global warming and climate change, we can try to minimize the outcome from climate change, but we have to also try to get rid of causes of global warming itself, namely to execute mitigation measurement. According to the scientific research, the greenhouse gases cause the climate change and the global warming, therefore the emission of GHG should be diminished urgently.

So far Korea does not take the responsibility to decrease the emission of GHG according to Kyoto Protocol, but the korean government established such a positive plan to cut 30% of the GHG emissions by 2020 from the expected 2020 BAU level of emissions and introduced the emission trading scheme. In this step the government's plan met the opposition from industry side, but the

⁵⁰⁾ <<http://www.gir.go.kr/main.jsp>>

government reached a compromise with the industry through patient dialogues. In this process of GHG emission reduction, the Korean parliament enacted three very important Acts regarding climate change mitigation.

According to the ETS the emission trading has started since Jan. 1, 2015. We hope that this emission trading scheme may contribute to the cutting effort of GHG beginning with Korea to the whole world. I anticipate that we may harmonize step by step interests of the related parties further and take steps toward the reduction of emission of GHG steadily. Regarding ETS the role of local government is very limited, but as to carbon sink it can do many things like designation of green land or ecological area according to the city planning law and the related law, award of subsidy to the activities of parties for reducing effort of GHG etc.

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[국문초록]

한국에 있어서 기후변화에 대한 대응방안

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지구온난화가 가져오는 피해는 심각하다. 각종의 기상이변이 보다 빈번하고도 그 강도 또한 더하여가고 있다. 지구온난화를 대처하는 방안으로는 나타나는 현상에 대해서 적용하는 수단들을 강구하는 것이 필요하다. 그렇지만 보다 근본적으로는 지구온난화를 야기하는 그 원인을 치유하는 것으로서 기후변화의 완화 방안이 보다 근본적이다.

현재의 과학기술에 의하면 지구온난화를 가져오는 원인의 하나로서 온실가스를 들고 있으며, 온실가스에 의한 지구온난화는 실험에 의하여 증명되고 있다. 그렇다면 온실가스의 배출을 줄이는 방향으로 나아가야 한다. 한국은 아직까지 교토의정서상 비부속서 국가로서 온실가스를 강제적으로 감축하여야 할 의무를 부담하지는 아니한다. 그렇지만 온실가스감축과 관련하여 수동적인 자세로부터 전향하여 보다 적극적인 자세로 2020년까지 BAU 30% 감축을 달성하고자 대책들을 수립하고 있다.

이러한 과정에서 물론 산업계, 수출주도형 기업 등으로부터 반대에 부딪치기는 하였으나, 점진적으로 온실가스감축을 향하여 나아가고 있다. 대표적인 정책으로서 녹색성장법, 배출권거래법 그리고 탄소흡수원법을 제정하여 시행하기에 이르렀다. 특히 온실가스배출권의 거래제도를 마련하여 2015년 1월 1일부터 시행하게 되었는데, 이를 통해서 온실가스 배출을 효율적으로 감축함으로써 우리나라로부터 시작하여 전세계적인 온실가스 감축에 이바지하게 되었다. 다만, 이러한 탄소배출권의 실시 과정에서 탄소배출권의 할당량이 부족하다면서 소송을 제기하는 등 다양한 법적인 쟁점들이 나타나게 되었으며, 이러한 법적 문제들을 어떻게 조화롭게 해결하는가의 문제가 대두되었다. 앞으로도 점진적으로 각계 각층의 이해관계를 적절하게 조화하면서 온실가스감축을 향하여 한걸음씩 꾸준히 나아가길 바라마지 않는다.

주 제 어: 지구온난화, 기후변화, 기후변화감축, 기후변화적응, 배출권거래제, 탄소흡수원, 목표관리제

Key Words: Global Warming, Climate Change, Climate Change Mitigation, Climate Change Adaptation, Emission Trading Scheme, Carbon Sink, Target Management System