# Energy and Environmental Policy in Korea

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1 Introduction

On August 15, 2008, the Korean government announced with great fanfare an initiative to reduce 30% of GWP (greenhouse weighted potential) GHG emission by 2020. The initiative, named 'Low Carbon Green Growth Initiative,' was also publicly declared before international society at the Copenhagen COP 15. Numerous follow-up policy measures have been prepared in short order. The Presidential Committee on Green Growth was established in Jan. 2009 and started to prepare the framework act on this initiative.

Massive R&D support for conventional and renewable energy technology development is to be provided with the announcement of the 3rd Master Plan for New and Renewable Energy Technology Development and Promotion (2008-2030). A legal framework for Low Carbon Green Growth was also provided by the enactment of the Framework Act on Low Carbon, Green Growth on Jan. 13th, 2010. Many of the existing energy and environment related legislation acts were subordinated under the new framework including the pre-existing framework act on energy. Policy measures such as GHG and Energy Target Management (June 2009), enactment of the Smart Grid Law (Nov. 2011), Green Building Support Law (Feb. 2012), and the legislation on the allocation and trading of greenhouse gas emission (May 2012) followed.

The idea of cleaning up the environment and fighting global warming is universally embraced. It is for the good of the whole human race. Especially, those industries to benefit from the generous government support of R&D and subsidies for renewable energy eagerly welcome policy measures to implement the idea. Realization of the goals, however, also requires restriction of business activities in conventional quarters of the economy to varying degrees. It could be in the form of new taxes or new regulations. Such measures are not popular and may even face strong resistance from the stakeholders affected by them. These measures are the real challenges that put the government’s will and skill to accomplish the goals to test. In this period of economic difficulty, does the government have the will to push the environmental agenda before economic stimulation? Does it have the skill and the public support to overcome any social conflicts caused by the restrictive measures?

There are several studies which examine the effects of various policy measures. For example, Kim (2011) discusses the environmental impact of the energy sector and the potential energy tax reform. Oh, et al. (2012) applied a CGE model to assess the economic impact of technological development and the introduction of a revenue neutral carbon tax for GHG reduction. Lim (2011) tried to find the major issues of climate convention related negotiations drawn from CGE model simulation results. Lim et al. (2012) provided a simulation result which shows that real GDP can grow without increasing CO2 emissions when R&D subsidies are combined with a carbon tax. But we also need to ask if those policy measures will be effectively implemented. It is still too early to answer this question when most of the policy measures have been just introduced or have yet to take effect.

By examining the legal framework, the governance structure and the details of the policy measures adopted so far, however, we may at least be able to get a glimpse of their potential and the government commitment toward the announced goals. Recent trends are not very promising. GHG emission is fast increasing. The legislation on the allocation and trading of greenhouse gas emission has been under controversy ever since the Korean National Assembly passed a law to start a carbon emission trading scheme from January 2015. The Presidential Committee on Green Growth has maintained a low profile.

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1 15th Conference of parties was held at Copenhagen on December 2009.
since the inauguration of the new president. In this chapter, we provide our assessment of the Korean environment and energy policies and discuss the problems and challenges.

The remainder of the chapter is organized as follows. Section 2 provides an overview of the Korean economy, GHG emission and energy. Section 3 explains the tasks and policy measures to combat climate change from the perspective of mitigation measures. In this section, detailed discussions on three major mitigation policies, namely, GHG emission reduction, renewable energy promotion and energy efficiency improvement are discussed. Especially for GHG emission reduction and renewable energy promotion policies, GHG and energy target management, emission trading system, the introduction of carbon tax and feed-in tariff, RPS, RFS are discussed in detail. This section assesses the achievements so far and discusses the problems including the challenges for the future. Section 4 concludes the chapter.

## 2 Overview of the Korean Economy, GHG Emission & Energy

With the per capita GDP increasing from less than 100 USD in 1960 to 20,757 USD in 2011, Korea has transformed itself from one of the poorest countries into the 15th largest economy of the world during the last 50 years. But recently, economic growth has been sluggish, with the annual growth rate dipping below 3 percent. In the energy sector, the average annual growth rate for primary energy consumption since 1998 is 3.53 percent, with renewable energy growing at 10.81 percent.

![Figure 1: Major Economic Indicators of the Korean Economy](image)

Source: KEEI (2012a)
Figure 1 shows the major economic indicators of Korea since 1990. During that period of time, GDP per capita increased 3.57 times, and primary and final energy consumption increased 2.96, and 2.74 times, respectively. With the increasing consumption of energy, GWP GHG (Greenhouse Gas) emission also increased. Figure 2 shows how GWP GHG emission increased during the same period. It is easily seen that the GHG emission pattern closely matches the economic activity and the energy consumption patterns. Especially during the Asian financial crisis which hit Korea severely in 2008, both energy consumption and GHG emission decreased drastically. Except that period of time, both energy consumption and GHG emission kept increasing continuously. The difference between total and net GWP GHG emission from the figure is explained by GHG absorption from LULUCF (land use, land-use change and forestry).

![Graph](image1)

**Figure 2 GWP (Global Warming Potential) GHG Emission Trend**
Source: GIR (2012)

Figure 3 shows the composition of GHG emission sources. The energy sector has been over 80% of GHG emission sources except the two years of 1995 and 1996, with its weight of 85.3% in year 2010. The recent trend of continuously increasing weight of the energy sector in GHG emission since 1996 is noteworthy. Industrial process, whose weight is gradually declining, is also related to the energy sector in terms of GHG emission, since it utilizes non-energy petroleum products such as naphtha, asphalt, lubricant, wax residue, etc.

![Graph](image2)
Figure 4 summarizes the significance of electricity in Korea’s energy sector in the 2011 Energy Balance Flow. The electricity sector is shown in the lower right corner. Korea depends on imports for 96.4 percent of the total primary energy supply. Out of 275.7 MTOE of total primary energy supply, 38.2 percent is comprised of oil. After going through the transformation process, electricity accounts for 19.01 percent of the total final energy of 205.9 MTOE. A further examination reveals, however, that 38.9% of primary energy sources are consumed to generate this expensive final energy of electricity. As depicted in the figure, the industrial sector consumes 53.2 percent of the power supply, while commercial and residential sectors consume 26.8 percent and 13.5 percent, respectively.
3 Legal Framework and Government Organizations

3.1 Politics and Environment Policy Trends

Korea’s environmental awareness grew with its political democratization. After decades of dictatorship backed by the military, Korea reached full-fledged democracy in 1998, with the election of the opposition leader Dae-Jung Kim as the president.

Although there has been environment related legislation before, it can be said that real attention to the environment was first paid during President Dae-jung Kim’s government (1998-2002). The main policy objective of his ‘Government of the People’ was to overcome the economic difficulties resulting from the Asian currency crisis which hit the Korean economy in mid-1997. In addition to economic restructuring to cope with these difficulties, his government also focused on the welfare of the people suffering from severe socio-economic transition in the crisis. Of his top ten policy priorities, the 8th was ‘to create a hospitable environment and comfortable culture’. That is, it included the promotion of a pleasant natural environment (forestry, pollution free metropolitan areas, water and coastal ocean), and care of the home land (waste reduction, eco-friendly industry, conservation with development). Within the framework of economic restructuring, his government emphasized energy conservation and increased energy supply capacity.

The next president, Mr. Rho (2003 – 2007), mostly focused on issues arising from the unbalanced development of urban and rural areas, cooperation among north-eastern Asian countries and the reunification of the Korean peninsula. His policy of balanced economic development naturally paid attention to sustainable development in both energy and environment issues. Stable energy supply, water management, management of national territory and natural system, etc. advanced by the presidential committee on sustainable development could be regarded as the major environmental policy process adopted by his government.

President Lee (2008 – 2012) emphasized the market economy to mobilize human capital and promote the so called ‘future growth engine for next generations’. Under the motto of ‘Global Korea’, his government listed projects such as an eco-friendly economy, energy diplomacy, north-east Asian oil hub, climate change and energy, the development of ecological parks and a grand canal, and active protection of people from various disasters. His environment policy was highlighted when he announced a national GHG emission reduction plan of ‘Low Carbon Green Growth’ initiative on August 15, 2008. This initiative aims to reduce by 30% GWP GHG emissions by 2020 based on the BAU (business as usual) energy forecast scenario. This target is the highest of the GHG reduction recommendations for developing countries by the IPCC (Intergovernmental Panel on Climate Change). The Presidential Committee on Green Growth was established on Jan. 2009 and started to prepare the framework act on this initiative.

To promote this program, and at the same time to develop a future growth engine, his government opened offices for climate change response policies in most of the government ministries. Massive R&D support for conventional and renewable energy technology development is to be provided with the announcement of the 3rd master plan for new and renewable energy technology development and promotion (2008-2030). A legal framework for Low Carbon Green Growth was also provided by the enactment of the Framework Act on Low Carbon, Green Growth on Jan. 13th, 2010. The pre-existing framework act on energy was subordinated to this new act. The introduction of GHG and energy target management was confirmed (June 2009), and the enactment of a smart grid law (Nov. 2011), green building support law (Feb. 2012), and the legislation on the
allocation and trading of greenhouse gas emission (May 2012) followed. The legislation on the allocation and trading of greenhouse gas emission has caused great controversy ever since the Korean National Assembly passed a law to start a carbon emission trading scheme from January 2015.

Although President Lee’s policies seem to have very clear targets on the environment and energy sectors, the actual policy implementation by his government has been exactly the opposite. The energy sectors of gas and power remained in the public sector without introducing market competition. A smart grid demonstration project was initiated without allowing retail competition. Energy conservation has been always a hollow claim without any proper energy policy attached. Policy adjustment of the adaptation and mitigation actions among the major ministries, especially between the Ministry of Environment and the Ministry of Knowledge Economy (currently, Ministry of Industry, Trade and Energy), was not properly managed. Figure 1 clearly shows the result of such policy ambivalences: during his government, total energy consumption has increased faster than during other governments. As a result, the energy sector composition in GHG emission increased.

The current president, Ms. Park, who was inaugurated in Feb. 2013, presented 5 national policy targets, with major focus on employment and welfare issues arising from the sluggish economy. The new motto is ‘Creative Economy’, and a brand-new Ministry of Science, ICT and Future Planning has been ordained to handle this goal. Her government’s environment policy is well stated in the 4th policy target of ‘the society with security and harmony’. Prevention of disaster from the fields of air, marine, nuclear, energy supply system, and the systematic management of environmental damage are proposed. At the same time, existing environmental policies for mitigation and adaptation continue to be observed since her policy targets clearly include GHG emission reduction, active response to climate change, stable energy supply and the promotion of renewable energy to achieve a pleasant and sustainable environment.

It is still too early to assess the energy and environment policy of the current government. Detailed plans for future nuclear power promotion, renewable energy promotion targets, and restructuring of the current energy price system are to be announced when the 2nd National Energy Master Plan is elaborated by the end of 2013. Since the environment policy pursued by the previous government has backfired in various aspects, it is not clear whether the basic principle of the framework act on low carbon green growth will survive in this government. The fact that the Presidential Committee on Green Growth co-chaired by the prime minister has not been active ever since the current president took office casts doubts on such prospects.

Most environment policy issues can be discussed within the framework of adaptation and mitigation. The following sections attempt to explain Korean environment policy within this framework in conjunction with the governance structure based on currently identifiable policies.

3.2 Legal Framework for Environment Policies

As already noted in the discussion on the governmental and environmental policy changes, the environment related legal framework is not well organized. It is not easy to identify all the laws and acts of Korea regarding the environment, either. Tables 10 and 11 in the Appendix of Environment Related Legislation, each with the Ministry of Environment (ME) as the office in charge (total of 52) and with other ministries as the office in charge (total of 66), have been prepared based on the 2012 white paper on the environment by ME. Environment related laws enacted before 1990 include Water Supply & Waterworks Installation Act (Dec.31,’61), Waste Cleaning Act (Dec.30,’61), Environmental pollution Prevention Act (Nov.5,’63), Act on Poison and Deleterious Material (Dec.13,’63), Sewerage Act (Aug.3,’66), Act on the Protection of Birds, Mammals
& Hunting (Mar.30,'67), Environmental Conservation Act (Dec.31,'77), Compound Waste Treatment Corporation Act (Dec.30,'79), Natural Park Act (Jan.4,'80), Environmental Pollution Prevention Corporation Act (May 1, '83), and Waste Management Act (enacted on Dec.31,'86).\(^2\)

Brief examination of the two tables would reveal that the environment related legislation acts are extremely complicated with a vast area of overlapping jurisdictions. Also, legal experts point out that they take the form of over-delegation. They take the form of a separate law system, overlapping in its contents with other environmental regulations, sometimes even contradicting them. They usually take a regulator-oriented framework and excessively depend on direct regulation. As such, they are criticized to be inefficient and unrealistic. According to Koh (2012), the introduction of an integrated environmental law is necessary to protect the environment more efficiently. Integration and harmonization of environmental laws are said to generate a simpler process, more transparent potential for deregulation, and stronger environmental protection. From this perspective, though, the enactment of the 'Framework Act on Low Carbon, Green Growth' on Jan. 13, 2010 is notable. The legislative intent of this framework act is written in article 1 as 'to promote the development of the national economy by laying down the foundation necessary for low carbon, green growth and by utilizing green technology and green industries as new engines of growth, so as to pursue harmonized development of the economy and environment and to contribute to improvement of the quality of life of every citizen and to a mature, top-class, advanced country that shall fulfill its responsibility in the international community through the realization of a low-carbon society'. It intends to integrate all of the existing legislation on sustainable economic development and the quality of the environment as a framework act and to ordain all future legislation within its framework.

Caution is required in referring to the categorization of environment related laws in the two tables, since it was prepared by ME which mostly focuses on adaptation policy. However, this is the only currently available document on the summary of related legislation.

### 3.3 Current Government Structure

MOSF (Ministry of Strategy and Finance) announced the government organization of the new government on March 23\(^rd\) 2013. Table 1 summarizes the names of ministries and their major affiliations with acronyms.

<table>
<thead>
<tr>
<th>Name of the Ministry</th>
<th>Major Affiliations</th>
</tr>
</thead>
<tbody>
<tr>
<td>PS</td>
<td>Presidential Secretariat</td>
</tr>
<tr>
<td>PMO</td>
<td>Prime Minister's Office</td>
</tr>
<tr>
<td>NHRCK</td>
<td>National Human Rights Commission of Korea</td>
</tr>
<tr>
<td>NIS</td>
<td>National Intelligence Service</td>
</tr>
<tr>
<td>KCC</td>
<td>Korea Communications Commission</td>
</tr>
<tr>
<td>NTSC</td>
<td>National Tax Service</td>
</tr>
<tr>
<td>NCS</td>
<td>Korea Customs Service</td>
</tr>
<tr>
<td>NPS</td>
<td>Public Procurement Service</td>
</tr>
<tr>
<td>NSO</td>
<td>National Statistics Office</td>
</tr>
<tr>
<td>MSIP</td>
<td>Ministry of Science, ICT &amp; Future Planning</td>
</tr>
<tr>
<td>MOE</td>
<td>Ministry of Education</td>
</tr>
<tr>
<td>MOFA</td>
<td>Ministry of Foreign Affairs</td>
</tr>
<tr>
<td>MOU</td>
<td>Ministry of Unification</td>
</tr>
<tr>
<td>MOJ</td>
<td>Ministry of Justice</td>
</tr>
<tr>
<td>MND</td>
<td>Ministry of National Defense</td>
</tr>
<tr>
<td>MMA</td>
<td>Military Manpower Administration</td>
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</table>

\(^2\) Dates in parentheses denote those of enactment. For further details, refer to Appendix.
For a better understanding of the organizational structure, an organization chart is prepared in Figure 5. MSIP and MOF are newly established ministries while major adjustment of jurisdiction has been made for several ministries such as MOE, MOFA, MOSPA, MAFRA, MOTIE and MOLIT as noted with bold boxes in this figure. MSIP, a newly established ministry ordained to manage science, ICT & future planning, has jurisdiction over vast areas of the government. A lot of science and technology related jurisdictions of the previous government have been moved to this ministry from the National Science and Technology Commission, Ministry of Science and Education, Ministry of Knowledge Economy, Ministry of Security and Public Administration and Ministry of Culture, Sports and Tourism. MOF is newly established to combine the marine and fishery jurisdictions which used to be separately managed by Ministry of National Territory and Ministry of Agriculture & Food.

Among the ministries with major jurisdiction adjustment, MOFA is redesigned to focus on foreign affairs by transferring its role on trade policy and administration to MOTIE, while MOTIE has to give up most of its technology related jurisdictions to MSIP. There has not been much jurisdictional adjustment for ME.
3.4 Environment Policy and Government Organization

As was noted earlier, the Framework Act on Low Carbon Green Growth puts the prime minister’s office at the top of energy and environment policy coordination. This had been previously managed by the Presidential Committee on Green Growth co-chaired by the prime minister. Figure 6 shows the structure of this organization.

Figure 5 Current Government Structure
Note: Adjustment of jurisdiction has been made for the ministries within bold boxes.
Source: MOSF (March 23, 2013)

Figure 6 Organization of Presidential Committee on Green Growth
Source: Available at https://www.greengrowth.go.kr/
As the main government sector for environment policy, the Ministry of Environment manages the following major environmental policies:

- Green growth,
- Water quality and water eco-system,
- Water supply, sewerage, soil and groundwater,
- Waste and recycling,
- Territorial and natural environment,
- Air pollution and climate change and
- International cooperation.

Especially for the GHG emission reduction management, KMA, an affiliate of ME, is to monitor and forecast climate change. GIR (Greenhouse Gas Inventory & Research Center of Korea), established in June 2010 as the premier research institute for climate change, is designated as a think-tank for low carbon green growth, playing the role as information hub of comprehensive and efficient greenhouse information management to accelerate green growth. It currently operates the integrated electronic administration of the national greenhouse gas management system (NGMS).

Environmental policies can be divided into two broad categories: mitigation and adaptation. Mitigation involves reducing the magnitude of climate change itself and can be subdivided into two alternative strategies: emissions reductions (dealing with the problem at its very source), and geo-engineering (attempting to offset the climate changes themselves through other means, for example carbon capture and sequestration, of human intervention in the climate system). Adaptation, by contrast, involves efforts to limit our vulnerability to climate change impacts through various measures, while not necessarily dealing with the underlying cause of those impacts.3

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For the adaptation to climate change, the Korean government (2010) announced the sectors for adaptation and assigned the ministries in charge as is shown in Figure 7. Overall coordination of adaptation measures is to be conducted by the Ministry of Environment. Most of the government ministries and agencies are to cooperate for adaptation measures: for example, ME is to work for adaptation sectors such as health, water management, eco-system, climate change monitoring, forecast and industry adaptation, energy with MW, MOLIT, MAFRA, MOE, KMA, and MOTIE.

The Ministry of Trade, Industry and Energy (MOTIE)\(^4\) is to set policy directions on industry, trade and energy. For energy policy directions, it lists four main policy goals, namely,

✓ Manage the national energy supply— prevention of accidents
✓ Promote overseas energy development projects
✓ Implement environmentally responsible growth policies
✓ Combat climate change.

This is a slight change in policy directions from the previous MOTIE’s policy target of ‘securement of stable energy supply for sustainable economic development’. For ‘combat climate change’, the policies of establishment of a carbon market, promotion of voluntary agreement to reduce greenhouse gas emissions, and support for research and development pertaining to green technologies are newly included in addition to the existing energy policies such as energy conservation, efficiency improvement and renewable energy promotion with the reduction of the reliance on fossil fuels. For ‘reduction of GHG emission from the energy sector’, energy sources such as renewable energy and nuclear power are promoted. At the same time, rational energy utilization and energy conservation policy is mandated for the industry, building and transportation sectors.

For ‘promotion of renewable energy’, a penetration target of 11% by 2030 has been set and RPS (renewable portfolio standard) has been adopted since 2012, with additional support for its supply and technology development through R&D. For ‘energy conservation’, an efficiency improvement target of 46% by 2030 has been set and follow-up energy demand management policy will be administered.

As discussed, most of MOTIE’s policies are geared toward mitigation actions. Adaptation actions such as the prevention of accidents in the process of managing national energy supply, however, are also explicitly mentioned.

Table 2 shows the mitigation policies, measures and instruments with their key constraints or opportunities combined with the current government organizations potentially to participate. The selection of the government organizations are subjectively made based on the explanation in the column ‘Policies, measures and instruments shown to be environmentally effective’ and current jurisdictions of the Korean government organization. For most of the mitigation policies, measures and instruments which require incentive structures based on government budget, MOSF is expected to participate. At the same time, sectors such as energy supply, transport, building and industry are clearly under the jurisdiction of MOTIE. Other sectors such as agriculture, forestry/forests and waste would expect the participation of MAFRA, KFS, PPS (MOSF), MOLIT and ME.
It is interesting to note here that there has been an acute dispute between MOTIE and ME for both defining their roles in the actual implementation of climate change related measures and understanding the importance of mitigation or adaptation policy. ME by its nature puts emphasis on adaptation while MOTIE focuses on mitigation. While implementing adaptation measures such as the installation of a monitoring system at industrial chimneys for air pollution detection, ME may think that these measures are...
within its own realm of policy implementation. But MOTIE, which is in charge of the industry and has its own office for climate change, may think differently.

4 Tasks and Policy Measures to Combat Climate Change

The laws and government organizations explained in the previous section have produced many policy measures and action plans. Discussions in the previous section indicate that environment policy for adaptation measures covers a wide range of socio-economic issues and would not be easy to cover here. Instead, it would be better to focus on the environment policy for mitigation actions. Mitigation actions can be broadly divided into three categories by their strategic goals: GHG emission reduction, renewable energy promotion, and energy efficiency improvement. This section explains the details of these policies and plans.

4.1 GHG Emission Reduction

4.1.1 GHG and Energy Target Management

GHG and Energy Target Management program is a hands-on approach for select large energy users which together account for about 60% of the total GHG emission. It sets specific goals for their emission reduction, energy savings, and energy efficiency enhancement, and then monitors their progress. The program was announced in 2009 and a pilot program was launched with 48 energy-intensive companies in 2010. The official program took effect in March 2011, starting with 410 largest companies or plants and gradually expanding the target companies. Table 3 shows the schedule and the criteria for selecting the target companies.

Table 3 Schedule of Energy Target Management

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Company</th>
<th>Plant</th>
<th>Company</th>
<th>Plant</th>
<th>Company</th>
<th>Plant</th>
</tr>
</thead>
<tbody>
<tr>
<td>By CO₂ (Ton)</td>
<td>125,000</td>
<td>25,000</td>
<td>87,500</td>
<td>20,000</td>
<td>50,000</td>
<td>15,000</td>
</tr>
<tr>
<td>By Energy (Tera Joules)</td>
<td>500</td>
<td>100</td>
<td>350</td>
<td>90</td>
<td>200</td>
<td>80</td>
</tr>
<tr>
<td>(TOE)</td>
<td>12,000</td>
<td>2,400</td>
<td>8,400</td>
<td>2,100</td>
<td>4,800</td>
<td>1,900</td>
</tr>
<tr>
<td>Expected Number of Target</td>
<td>170</td>
<td>240</td>
<td>220</td>
<td>250</td>
<td>300</td>
<td>280</td>
</tr>
<tr>
<td>Companies or Plants</td>
<td></td>
<td></td>
<td></td>
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ME, MAFRA, MOTIE and MOLIT are in charge of the program’s implementation, with the Ministry of Environment playing the leading role. The implementation is both top-down and bottom-up. The reduction goals are first set at the national level, then at the sector level and finally at the industry level. Individual target companies and the ministry in charge negotiate the annual company-level reduction goals considering the company’s investment plans, reduction potential and the upper level reduction goals. Once the goals are set for the target companies, the ministry reviews their execution plans and monitors their progress. It also provides various financial and technical support. Figure 8 shows the number of companies selected for energy target management from 2010 to 2012 out of 15 different industrial sectors.
4.1.2 Emission Trading System

In May 2012, the Korean National Assembly passed a law to start a carbon emission trading system (ETS) from January 2015, and the Government announced its implementing ordinances in November 2012. The master plan is expected to be completed in December 2013, and the general rules on rights allocation, trading, certification, etc. will be announced in June 2014.

Though enacting legislation for the emission trading scheme is all but finished, there are still controversies surrounding it. The business society is expressing concern on the impact on the economy and is requesting the government to consider delaying its introduction. It points to the recent global recession and the crisis in the European emission trading market for the reasons. It also points out that even some of the advanced countries like the U.S., Japan, and the biggest emitter, China, do not have a national emission trading scheme yet, and argues that the early adoption by Korea may jeopardize its competitiveness. It also demands that the free rights allocation period should be extended to beyond 2020.

But, as the seventh biggest emitter of CO₂ (in 2010), Korea recognizes its duty to contribute to the world’s effort to reduce GHG, though it is not a signatory of the Kyoto Protocol. The government has already announced its goal of reducing GHG emission by 30% from BAU by 2020. The proponents of ETS insist that it is the most cost effective way of reducing emissions, and that we should be the leader in the global effort to reduce GHG instead of waiting for others to act first.
The trading scheme will be cap-and-trade. The government first sets the emission reduction goal at the national level for the planning period of ten years, with adjustment every five years. The goals at the sector level will be set next, followed by those of the industry level. Based on these goals, emission caps are determined at the sector and industry levels, and finally emission caps for individual companies are determined considering their past emission levels and available technologies. ME is to be the primary government authority over this program. However, there are channels through which other ministries can be involved so that the interests of various sectors can be represented. One of such channels is the Emission Rights Allocation Committee in charge of the major issues on emission rights allocation and trading. The Committee will be filled with the deputy ministers of the related ministries and chaired by MOSF. There are lower level committees such as the Allocation Review Committee and the Validation Committee, also to be filled with officials from various ministries.

The scheme will include all the sectors and industries covered by the Energy Target Management program. Companies emitting more than 125,000 CO₂/year and plants emitting 25,000 CO₂/year are mandatorily included. Voluntary participation is allowed. Those who are included in the Energy Target Management program are to be exempted. In the first stage of the program (2015-2017), 100% of the emission rights will be allocated to individual companies for free. The proportion will go down to 97% for the second stage (2018-2020), and to 90% or less afterwards. However, those industries determined to be export-intensive or highly affected by the scheme are to be granted free allocation. Figure 9 in the Appendix shows the implementation process of the emission trading scheme and Table 4 summarizes and compares target management and ETS.

Table 4 Comparison of Energy Target Management Program and Emission Trading Scheme

<table>
<thead>
<tr>
<th></th>
<th>Target Management</th>
<th>ETS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goal Setting</td>
<td>National goal: 30% reduction against BAU by 2020</td>
<td>Goals by sectors and industries set in accordance with the national goal</td>
</tr>
<tr>
<td>Measuring Reporting</td>
<td>Use the same system</td>
<td></td>
</tr>
<tr>
<td>Verifying</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operation mode</td>
<td>Command and control</td>
<td>Market mechanism</td>
</tr>
<tr>
<td>Planning interval</td>
<td>Single year</td>
<td>Multi-year (5 years)</td>
</tr>
<tr>
<td>Outsourcing</td>
<td>Not allowed</td>
<td>Allowed</td>
</tr>
<tr>
<td>Methods for attaining goals</td>
<td>Reduction only</td>
<td>Reduction +Rights purchase, borrowing, offsetting</td>
</tr>
<tr>
<td>Reward for over attainment</td>
<td>None</td>
<td>Rights sales or carry-over</td>
</tr>
<tr>
<td>Penalty level</td>
<td>10 million won max. (fixed)</td>
<td>Fines proportional to over-emission</td>
</tr>
</tbody>
</table>

Source: Prime Minister’s Office, Nov.13, 2012

4.1.3 Introduction of Carbon Tax

Korea does not have a carbon tax but has a Transportation, Energy and Environment Tax and a Driving Tax. These taxes are similar to the carbon tax in that they are added to transportation fuel prices, but they are not applied to other sources of GHG emission. They are special purpose taxes, the revenue from which is earmarked for transportation and environment related purposes, and those taxes on fuel prices are scheduled to expire by the end of 2015 after a series of consecutive extensions in 2009 and 2012. With the termination of these taxes approaching, in addition to the relatively simple tax structure of car ownership related taxes for potential tax system restructuring (HRI, 2010), the introduction of a carbon tax is being hotly debated in Korea. Proponents argue that these taxes should be replaced by a carbon tax with broader scope to address the plan for GHG reduction. It also seems to appeal to politicians due to its wider tax base, which
can more than make up for the tax revenue reduction due to the termination of the existing taxes. The opponents, mostly from the business sector, argue that a carbon tax would impose too much burden on the Korean economy considering Korea’s energy-intensive industrial structure. They argue that a new carbon tax in addition to other existing energy taxes and the new emission trade system would impose double taxation on Korean industry and so would weaken its competitiveness.5

4.2 Renewable Energy Promotion

4.2.1 Feed-in Tariff

Korea introduced a Feed-in Tariff (FIT) for renewable energy generation in 2002. The program gradually expanded coverage until it was terminated and replaced by the Renewable Portfolio Standard (RPS) in 2012. It applied to such renewable energy generation as photovoltaic, wind, hydro, bioenergy, waste combustion, ocean energy and fuel cell. It supported these renewable energies by purchasing the generated power at very generous prices above the market price to cover the high cost. The purchase prices were guaranteed for 15 years (20 years optional for photovoltaic). However, there were limits for total coverage applied to photovoltaic, wind, and fuel cell at 500MW, 1000MW, and 50MW, respectively. Tables 5 and 6 show the guaranteed prices. No new support is to start after 2011. For reference, the average wholesale price for electricity in 2011 was KRW 126.63 /kWh.

Table 5 FIT Support for Renewable Energy Production (2009)

<table>
<thead>
<tr>
<th>Energy source</th>
<th>Capacity criteria</th>
<th>Category</th>
<th>Guaranteed price(Won/kWh)</th>
<th>Annual adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wind</td>
<td>≥ 10 kW</td>
<td>-</td>
<td>107.29</td>
<td>-2%</td>
</tr>
<tr>
<td>Hydro</td>
<td>≤ 5 kW</td>
<td>usual</td>
<td>86.04 SMP+15</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>&lt; 1 MW</td>
<td>94.64 SMP+20</td>
<td></td>
</tr>
<tr>
<td>Waste combustion</td>
<td>≤ 20 kW</td>
<td>special</td>
<td>86.18 SMP+5</td>
<td></td>
</tr>
<tr>
<td>(including RDF)</td>
<td></td>
<td>&lt; 1 MW</td>
<td>72.8 SMP+10</td>
<td></td>
</tr>
<tr>
<td>Bioenergy source</td>
<td>≤ 50 kW</td>
<td>LFG</td>
<td>68.07 SMP+5</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Biogas</td>
<td>74.99 SMP+10</td>
<td></td>
</tr>
<tr>
<td>Biomass</td>
<td>≤ 50 kW</td>
<td>lignocellulose</td>
<td>88.99 SMP+5</td>
<td></td>
</tr>
<tr>
<td>Ocean energy</td>
<td>≥ 50 kW</td>
<td>max gap</td>
<td>w/ dike 62.81 -</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>≥ 8.5m</td>
<td>w/o dike 76.63 -</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>&lt; 8.5m</td>
<td>w/o dike 90.5 -</td>
<td></td>
</tr>
<tr>
<td></td>
<td>≥ 200 kW</td>
<td>biogas fuel</td>
<td>227.49 -</td>
<td>-3%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>other fuel</td>
<td>274.06 -</td>
<td></td>
</tr>
</tbody>
</table>

Source: MKE (2008)

* SMP: System Marginal Price in Korean wholesale power market

For further references on the discussions of carbon tax and restructuring of current energy and environment tax system, refer to Kang et al. (2011) and Kim (2011).
The Renewable Portfolio Standard (RPS) program started in 2012, to replace the existing FIT program. Power generation companies with over 500MW capacity are to supply a certain amount of electricity generated with renewable energy. Currently 13 companies have this duty. The aggregate renewable proportion is to increase gradually from 2 percent in 2012 to a maximum of 10 percent in 2022. The generation quantity for each company is individually determined considering total generation and the energy source. Special favor is given to photovoltaic generation with a separate target quantity to be distributed to the participating companies. Also different weights are assigned to different renewable energy sources considering their effects on the environment and the economy, generation cost, and GHG reduction. The renewable generation supported by FIT is not eligible for RPS.

The participating companies can generate the renewable electricity themselves or purchase Renewable Energy Certificates (REC) from others. Or they can put off up to 20 percent of their annual assignment to the next year⁶. To encourage private sector participation, the 6 affiliates of KEPCO should outsource at least 50 percent of photovoltaic generation. REC’s are traded in the Korea Power Exchange for one day every month.

During the first year of RPS implementation of 2012, 842 MW of renewable generation capacity was newly added, which is impressive compared with the 1024 MW cumulative installed capacity during the 10 years prior to RPS. On the other hand, however, only 64.7 percent of the annual generation target was fulfilled. For photovoltaic, it was 95.7 percent but for others it was 63.3 percent. As a result, even after the allowed 30 percent carry-over⁷, many generation companies face fines. The total amount of the penalty is US$23 Million dollars.⁸ The penalty determined is 1.31 times of the original estimation based on the unfilled obligation (597,889 REC, 9.03%) times average REC price (KRW 32,331 per REC) of non-PV. It is reported that the penalty will be finalized considering the conditions of the participant.

Table 7 shows the weights, detailed conditions for installation such as type, place and capacity for each renewable energy source applicable to RPS.

---

4.2.2 Renewable Portfolio Standard

Table 6 FIT Support Scheme Changes for Photovoltaic Power Generation (Won/kWh)

<table>
<thead>
<tr>
<th>start year</th>
<th>Install place</th>
<th>Support period (yr)</th>
<th>≤30kW</th>
<th>&gt; 30kW ≤ 200kW</th>
<th>&gt; 200kW ≤ 1MW</th>
<th>&gt; 1MW ≤ 3MW</th>
<th>&gt; 3MW</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>-</td>
<td>15</td>
<td>646.96</td>
<td>620.41</td>
<td>590.87</td>
<td>561.33</td>
<td>472.7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20</td>
<td>589.64</td>
<td>562.84</td>
<td>536.04</td>
<td>509.24</td>
<td>428.83</td>
</tr>
<tr>
<td>2010</td>
<td>Land</td>
<td>15</td>
<td>566.95</td>
<td>541.42</td>
<td>510.77</td>
<td>485.23</td>
<td>408.62</td>
</tr>
<tr>
<td></td>
<td>Building</td>
<td>20</td>
<td>514.34</td>
<td>491.17</td>
<td>463.37</td>
<td>440.2</td>
<td>370.7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>15</td>
<td>606.64</td>
<td>579.32</td>
<td>546.52</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20</td>
<td>550.34</td>
<td>525.55</td>
<td>495.81</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2011</td>
<td>Land</td>
<td>15</td>
<td>484.52</td>
<td>462.69</td>
<td>436.50</td>
<td>414.68</td>
<td>349.20</td>
</tr>
<tr>
<td></td>
<td>Building</td>
<td>20</td>
<td>439.56</td>
<td>419.76</td>
<td>396.00</td>
<td>376.20</td>
<td>316.80</td>
</tr>
<tr>
<td></td>
<td></td>
<td>15</td>
<td>532.97</td>
<td>508.96</td>
<td>480.15</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20</td>
<td>483.52</td>
<td>461.74</td>
<td>435.60</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Source: MKE (2009)

---

⁶ It is up to 30 percent until 2014.
⁷ Actual carry-over is 26.3%.
⁸ Based on the press release on Sept. 16th. For prior estimation on this penalty, refer to MOTIE (2013). Won/dollar exchange rate of 1,100 applied.
### Table 7: Weights for Power Generation by Renewable Energy Types

<table>
<thead>
<tr>
<th>Renewable energy source</th>
<th>Weight</th>
<th>Details on Installation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Type</td>
</tr>
<tr>
<td>Photovoltaic</td>
<td>0.7</td>
<td>land</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>others</td>
</tr>
<tr>
<td></td>
<td>1.2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.5</td>
<td>Building or other existing structure</td>
</tr>
<tr>
<td>Other renewables</td>
<td>0.25</td>
<td>IGCC, product gas</td>
</tr>
<tr>
<td></td>
<td>0.5</td>
<td>waste, land fill gas</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Hydro, onshore wind, bioenergy, RDF, waste gasification, tide with dike</td>
</tr>
<tr>
<td></td>
<td>1.5</td>
<td>Lignocellulosic biomass power generation, offshore wind (within 5 km)</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Offshore wind (over 5km), tide w/o dike, fuel cell</td>
</tr>
</tbody>
</table>

Source: MOTIE (2010)

### 4.2.3 Renewable Fuel Standard

Korea is also to introduce a Renewable Fuel Standard (RFS). In June 2013, the National Assembly passed an amendment to the Renewable Energy Development, Utilization and Promotion Act, to introduce RFS for transportation fuels from 2014 to 2020 in three stages. Since 2012, Korea has had a regulation that transportation diesel fuel should include at least 2 percent bio-diesel. The new law will gradually increase this ratio up to 5 percent by 2020. Also bio-gas and bio-ethanol will be included in the program from 2017 and 2020, respectively. Domestic oil-refining companies and oil importers bear the responsibility of meeting the RFS. According to a study, this new program is expected to reduce CO$_2$ emission by 3 to 3.8 million tons. However, as of September 2013, the implementation of RFS is expected to be postponed due to the high dependence on imported bio-fuels.

### 4.3 Energy Efficiency Improvement and Other Policy Measures

In 2008, the government announced the 4th Master Plan for Rational Energy Use, which lays the groundwork for energy efficiency policies for 2008 to 2012. It aims to improve energy efficiency by 11.3 percent by 2012 and 23.5% by 2017. It contains scores of policy initiatives in four areas: energy efficiency R&D, energy demand management, market creation and improvement, and social and regulatory infrastructure. Some of the initiatives are symbolic or look like slogans, such as green government buildings and promoting energy-saving life style, and some seem to be simply government wishes. For example, the government has not acted on the plan to revamp the electricity tariff structure yet although it has 100 percent control of the tariffs. However, other initiatives have substance involving specific actions. For instance, the plan to ban incandescent light bulbs from 2013 has actually been carried out. Energy demand management plans apply to four sectors: industry, transportation, buildings, and the public sector.

Table 8 summaries energy efficiency policies announced in the 4th Master Plan.

---

9. These figures were presented by Lim, Eu-Soon at a public hearing organized by Ministry of Knowledge Economy on Feb. 2, 2013.
10. This view was expressed by a government officer who participated in a seminar organized by a National Assembly member on Sep. 11, 2013.
11. 5th Master Plan is not out yet.
12. The ban is to take effect from 2014.
13. KEEI (2010) is a preliminary research published for the preparation of the 5th Master Plan for Rational Energy Utilization, although it was not officially adopted by government.
### Table 8 Summary of Energy Efficiency Policies in 4th Master Plan for Rational Energy Utilization

<table>
<thead>
<tr>
<th>Area</th>
<th>Sector</th>
<th>Policies</th>
<th>Office in Charge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy efficiency R&amp;D</td>
<td>Core technology</td>
<td>Building energy efficiency system (BEMS) R&amp;D</td>
<td>MOTIE, MOLIT</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Electricity use efficiency R&amp;D</td>
<td>MOTIE</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Energy storage R&amp;D</td>
<td>MOTIE</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Green Car R&amp;D</td>
<td>MOTIE, MOLIT, ME</td>
</tr>
<tr>
<td></td>
<td></td>
<td>LED R&amp;D</td>
<td>MOTIE</td>
</tr>
<tr>
<td></td>
<td>Application</td>
<td>7 top energy-intensive equipment R&amp;D</td>
<td>MOTIE</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6 green home appliances R&amp;D</td>
<td>MOTIE</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7 top energy-intensive equipment R&amp;D</td>
<td>MOTIE</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6 green home appliances R&amp;D</td>
<td>MOTIE</td>
</tr>
<tr>
<td>Demand management</td>
<td>Industry</td>
<td>Customize energy policy for energy-intensive plants by size</td>
<td>MOTIE</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Expand Energy Saving through Partnership (ESP) program</td>
<td>MOTIE</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tax and financial support for energy saving investments</td>
<td>MOSF, MOTIE</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Expand support for energy clinic</td>
<td>MOTIE</td>
</tr>
<tr>
<td></td>
<td>Transportation</td>
<td>Support energy service company (ESCO)</td>
<td>MOTIE</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Improve fuel efficiency labeling</td>
<td>MOTIE</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Keep raising fuel efficiency standards</td>
<td>MOTIE</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Better support hybrid vehicle promotion</td>
<td>MOSF, MOSPA, MOTIE, MOLIT, ME</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Infrastructure for Eco-driving</td>
<td>MOTIE, MOLIT, ME</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Introduce energy-intensive transportation company reporting system</td>
<td>MOTIE, MOLIT, ME</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Promote 'no driving day' program</td>
<td>MOLIT</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Introduce new public transport</td>
<td>MOLIT</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Promote rail traffic</td>
<td>MOLIT</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Promote bicycle riding</td>
<td>MOSPA, MOLIT</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Eco-friendly and efficient airport, port, fishing boats</td>
<td>MAFRA, MOLIT</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Advanced logistics system</td>
<td>MOKIT</td>
</tr>
<tr>
<td></td>
<td>Buildings</td>
<td>Effective energy planning consulting</td>
<td>MOTIE, MOLIT</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Expand community energy service (CES) program</td>
<td>MOTIE</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Strengthen energy-saving design standards</td>
<td>MOTIE</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Expanding building energy efficiency rating certification</td>
<td>MOTIE</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Expand green building supply</td>
<td>MOLIT, ME</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Introduce total building energy consumption design</td>
<td>MOLIT</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Expand voluntary agreement with energy-intensive buildings</td>
<td>MOTIE</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Smart meter program</td>
<td>MOTIE</td>
</tr>
<tr>
<td>Public sector</td>
<td></td>
<td>Green government buildings</td>
<td>MOSPA</td>
</tr>
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<td></td>
<td>Green governmental IT</td>
<td>MOSPA</td>
</tr>
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<td></td>
<td>Promote regional energy program</td>
<td>MOTIE</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total energy consumption cap for public buildings</td>
<td>MOTIE</td>
</tr>
<tr>
<td>Market creation and</td>
<td>Market creation</td>
<td>Expand energy efficiency product certification</td>
<td>MOTIE</td>
</tr>
<tr>
<td>improvement</td>
<td></td>
<td>Support promote high energy efficiency products</td>
<td>MOSF, MOTIE</td>
</tr>
<tr>
<td></td>
<td>Market change</td>
<td>Home appliances energy efficiency “Top-Runner” program</td>
<td>MOTIE</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Expand energy efficiency rating labeling</td>
<td>MOTIE</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CO2 level in energy efficiency labels</td>
<td>MOTIE</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Standby power warning label</td>
<td>MOTIE</td>
</tr>
<tr>
<td>Ration and regulatory</td>
<td>Market close</td>
<td>Expand minimum efficiency standard, ban incandescent light bulbs</td>
<td>MOTIE</td>
</tr>
<tr>
<td>infrastructure</td>
<td></td>
<td>Introduce dynamic pricing in electricity</td>
<td>MOSF, MOTIE</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Allow gas rate differences by consumption pattern</td>
<td>MOSF, MOTIE</td>
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<td></td>
<td>Optimal transportation fuel portfolio</td>
<td>MOSF, MOTIE</td>
</tr>
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<td>Heat price cap by area</td>
<td>MOSF, MOTIE</td>
</tr>
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<td>Incentive to reduce fuel cost for heating</td>
<td>MOSF, MOTIE</td>
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<td></td>
<td>Social and regulatory infrastructure</td>
<td>Promote energy saving and GHG reduction</td>
<td>MOTIE, MOLIT, ME</td>
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<td></td>
<td></td>
<td>Early education for energy saving</td>
<td>MOLIT, ME</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Carbon points and carbon rebate program</td>
<td>ME, MOTIE</td>
</tr>
</tbody>
</table>

In 2010, 15 green energy technologies were selected for mid and long term energy technology targets. It clearly shows that PV, wind and fuel cell are strategically selected for future technology development targets among 8 renewable energies and 3 new energies defined by law. For the utilization of fossil fuel, it is noted that cleaner use of fossil fuel such as clean coal technology and IGCC are explicitly mentioned for technology development in addition to carbon capture and storage (CCS).

<table>
<thead>
<tr>
<th>Clean Energy Production</th>
<th>PV, Wind, Hydrogen and Fuel Cell, IGCC, Nuclear</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cleaner Fossil Fuel</td>
<td>Cleaner Fuel, CCS</td>
</tr>
<tr>
<td>Energy Efficiency Improvement</td>
<td>Power Sector IT, Energy Storage, Small Co-generation, Heat Pump, Superconducting, Car Battery, Building Energy, LED</td>
</tr>
</tbody>
</table>

Source: MKE(2010)

It is shown from the above table that nuclear energy is categorized as clean energy production in Korea since it does not emit CO₂ in its power generation process. Nuclear power has been producing more than 30% of electric power ever since 1986. Korea, with very limited indigenous energy resources, has been heavily dependent upon nuclear power. It produced more than 40% of total electric power until as recently as 2006. After the 2011 Fukushima accident, however, with increasing concerns over nuclear safety and the fraud scandal in nuclear power plant construction and maintenance, a team of 58 from South Korea’s nuclear safety agency inspected all 23 of the nation’s nuclear plants in Nov. 2012. As a result, the proportion of nuclear power generation dropped below 30% for the first time since 1986. Min et al. (2012) discusses the potential environmental issues of nuclear power in north eastern Asian countries examining the seasonal wind directions and China’s nuclear plans. With massive promotion plans of over 280GW nuclear power in China including inland nuclear power plants and in areas potentially overlapping with seismic zones, any nuclear related environmental issue could be a problem of all countries in this region, they argued.

4.4 Evaluation of Tasks and Policy Measures

With its numerous legislative and organizational preparations, Korea now has the institutional infrastructure for active environment and energy policies. However, it does not mean that it is committed to the environmental policy targets it has already announced. As discussed in Section 3.1, the government’s stand toward the environment is affected by politics. Actual implementation of future environmental policies currently scheduled and expected such as ETS and the introduction of a carbon tax is still controversial and thus faces many uncertainties. A simple change in the governmental ordinance or a delay of scheduled programs can materially affect the effectiveness of these policies. Already, there are talks about postponement of the emission trading system and RFS.

Closer examination of past policy implementation results provides some insight toward this. During the period of 2000 to 2010, carbon intensity dropped 3.76% and renewable energy supply increased by more than 10%, both in annual growth rate. However, primary energy and final energy consumption increased by 4.18% and 2.66% per annum, respectively. As a result, total CO₂ emission increased by 2.67% per year. Especially during the period of 2005 to 2010, CO₂ emission increased by 4.17% per year. This period overlaps with President Lee’s government which declared “Green Growth” as its...
The relative success of renewable energy promotion on the one hand and the fast increase of CO₂ emission on the other imply a possible bias in policy implementation. The continuously high growth rate of renewable energy supply and lowering of carbon intensity suggest that future R&D support for technology development in energy and environment sector will continue. Supporting new technology is popular and faces little objection. For continuous implementation of other measures, however, a major modification of policy measures is expected. First, the accomplishment of a renewable energy obligation target other than PV for the first year of its introduction is only 63.3%. The postponement of implementation of RFS due to high dependence on imported bio-fuels is another policy change recently observed. Second, the accomplishment of a CO₂ emission reduction target is rather uncertain. The emission increase from 2011 to 2013, which is not yet officially publicized, in addition to the 17.6% emission increase confirmed during the previous five years poses a serious threat to a successful target accomplishment. The CO₂ reduction policy faces strong resistance from the emitters and places an immediate burden on the whole economy. As a result, it may suffer from ‘not in my term’ syndrome, passing its implementation to the next government and imposing ever increasing burdens to the future generation.

5 Conclusion

In this chapter, a brief survey on Korean environment and energy policy is presented. This overview provides information on the current status of the Korean economy, GHG emission, and energy supply and demand structure. Review of the changes in the legal framework reveals the characteristics of the current environmental regulation system. It is isolated, overlapping in its contents with other environmental regulations, and sometimes even contradictory to other regulations. The current status of energy and environment policy is still uncertain, although much of the environment policy had been openly announced by the previous government.

To avoid the complexity of discussion, the chapter focuses on the tasks and policy measures to combat climate change from the perspective of GHG mitigation. So it offers more detailed examination of the three major categories of mitigation measures: GHG emission reduction, renewable energy promotion and energy efficiency improvement. For GHG emission reduction, GHG and energy target management, emission trading system and carbon tax policy have been examined while the examination on FIT, RPS and RFS are conducted for the renewable energy promotion policy. Again, the successful progress of these policy measures may depend on the new government’s initiatives and surrounding economic conditions.

Obviously this review of Korean environment and energy policy is not only incomplete but incomplete. Issues such as better coordination framework of the adaptation and mitigation policies which requires the participation of most of the government organizations, collection of related information and analysis could be an interesting topic for further investigation.\(^\text{15}\)

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\(^{15}\) Almost all independent activities for information gathering and research are being conducted by entities such as NSO under PMO, KEMCO (Korea Energy Management Corporation), KEPS (Korea Energy Statistics Information System, http://www.kesis.net/) of KEEI under MOTIE, KEKO (Korea Environment Management Corporation), GIR, NGMS under ME, KMA under ME, KIER (Korea Institute of Energy Research) under MISP, KFS under MAFRA, MOLIT-related statistics (https://stat.molit.go.kr/) under MOLIT, etc.
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### Appendix

#### Table 10 Enactment of Environment Related Legislation (ME as Office in Charge)

<table>
<thead>
<tr>
<th></th>
<th>60 (Total of 6 Acts)</th>
<th>70~80 (Total of 9 Acts)</th>
<th>90~2012 (Total of 52 Acts)</th>
<th>Office in charge</th>
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<tbody>
<tr>
<td>1</td>
<td></td>
<td>Framework Act on Environmental Policy</td>
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<td>Clean Air Conservation Act</td>
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<tr>
<td>3</td>
<td></td>
<td>Framework Act on sustainable development</td>
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<td></td>
<td>Environmental Education Promotion Act</td>
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<td>Environmental Health Act</td>
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<tr>
<td>6</td>
<td></td>
<td>Indoor Air Quality Management Act</td>
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<td>7</td>
<td></td>
<td>Noise &amp; Vibration Control Act</td>
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<td>8</td>
<td></td>
<td>Special Act on Metropolitan Air Quality Improvement</td>
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<td></td>
<td>Water Quality and Ecosystem Conservation Act</td>
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<td>Act Relating to Han River Water Quality Improvement &amp; Community Support</td>
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<td>Act on Nakdong River Watershed Management &amp; Community Support</td>
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<td>Natural Environment Conservation Act</td>
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<td>Act on Special Measures for the Control of Environmental Offenses</td>
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<td>Environmental Dispute Adjustment Act</td>
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<td>Act on Environment Related testing and inspection</td>
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<td>Act to promote and support the reuse of water</td>
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<td>Act to facilitate the purchase of green products</td>
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<td>Artificial Light pollution Prevention Act</td>
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<td>Act on the Protection of Birds, Mammals &amp; Hunting</td>
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<td>27</td>
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<td>Natural Park Act</td>
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<td>Special Act on the Ecosystem Conservation of Small Islands such as Dokdo Island</td>
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<td>Wetland Conservation Act</td>
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<td>Environmental Impact Assessment Act</td>
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<td>Soil Environment Conservation Act</td>
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<td>Wildlife Protection Act</td>
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<td>National Trust Act on cultural heritage and natural environment assets</td>
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<td>Biodiversity Conservation and Utilization Act</td>
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<td>Environmental Management Corporation Act</td>
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<td>Development of &amp; Support for Environmental Technology Act</td>
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<td>38</td>
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<td>Act on Poison and Deleterious Material</td>
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<td>Toxic Chemicals Control Act</td>
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<td>Persistent organic pollutant Management Act</td>
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<td>Waste Control Act</td>
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<td>Act on the Disposal of Livestock Wastewater</td>
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<td>43</td>
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<td>Act on the circulation of electrical, electronic products and automotive resources</td>
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<td>Act on the Control of Trans-boundary Movement of Hazardous Wastes &amp; Their Disposal</td>
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### Table 11 Environment Related Legislation (Other than ME as Office in Charge)

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<td>1 Road Traffic Act,</td>
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<td>2 Road Traffic Act,</td>
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<td>3 Assembly and Demonstration Act</td>
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<td>5 Healthy schools Act</td>
<td>Noise</td>
<td>MOE</td>
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<tr>
<td>6 Automobile Management Act,</td>
<td>Air Pollution</td>
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<td>7 Construction Machinery Management Act,</td>
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<tr>
<td>8 Groundwater Act,</td>
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<td>9 River Act,</td>
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<tr>
<td>10 Act on aggregate collection</td>
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<td>11 Dam construction and the surrounding area support Act,</td>
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<td>12 National territories act</td>
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<td>13 National Territory Planning and Utilization Act,</td>
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<td>14 Building codes, city parks and greenery Act,</td>
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<td>15 City parks and green space Act,</td>
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<td>16 Acquisition of land for public utilities and Compensation Act,</td>
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<td>17 Urban Development Act,</td>
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<td>20 Metropolitan Area New Airport Construction Promotion Act</td>
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<td>21 Seoul Metropolitan Area Readjustment Planning Act,</td>
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<td>22 Urban and residential environments improvement Act</td>
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Source: ME (2012)
Figure 9 Emission Trading Scheme Process
Source: Prime Minister’s Office, Nov.13, 2012