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Ocean-Related Policies that Address Climate Change in the Republic of Korea

Hwang Sehee, Yosijae : Director of Future Planning, Future Consensus Institute

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Outline

The Republic of Korea (ROK) faces the ocean on three sides: east, west, and south. Its coastline has a length of 13,509 km and its territorial sea area is 86,891 km², which is equivalent to 87% of its land area. The ROK has promoted a policy aiming to be a maritime nation that places the Ocean and Fishery Development Plan, which was formulated under the Framework Act on Marine Fishery Development, at the top. As is expressed by the plan's name, the basic objective of the ROK's ocean policy is "development." The Second Ocean and Fishery Development Plan's implementation period is 2010 to 2020. At the time of its formulation in 2010, the objective was to achieve a vision of being an "advanced maritime power that leads the world" in 2020. As goals for realizing this vision, the plan establishes (1) management and protection of a sustainable marine environment, (2) development of new ocean industries and advancement of traditional ocean industries, and (3) expansion of ocean territory with active reception of a new maritime order. In this way, the ROK's ocean policy is focused on ocean management for sustainable development and economic growth.

However, the effects of climate change, which have become more conspicuous in recent years, have also affected the ROK's ocean policy. The ROK's responses to climate change are implemented under the Framework Act on Low Carbon, Green Growth, which was enacted in 2010. As the name implies, it is based on the concept of actively responding to climate change using science and technology and using that response as a source for new economic growth. The "Basic Plan for Climate Change Response" that is based on this Act exists as the top plan concerning the ROK's response to climate change. The Plan has an implementation period of twenty years. The Plan currently in effect is the second Plan and has an implementation period that extends from 2020 until 2040. Its objectives are to (1) promote reductions in greenhouse gases toward fulfillment of the Paris Agreement's target (control of temperature rise to 2°C, efforts toward limiting temperature rise to 1.5°C), (2) build a climate change response scheme, and (3) strengthen the nation's foundation for responding to climate change. In this paper, I will focus on the plan to provide an overview of the ROK's climate change response, giving particular attention to the oceans.

1. Responses to environmental problems and climate change emerge as a social issue

During a recent ten-year period (2008-2017), 152 people lost their lives and some 200,000 people suffered damage as a result of weather disasters in the ROK. The economic loss associated with property damage and recovery reached 10.7 trillion won. The damage caused by typhoons and torrential rains made up 88.4% of all damage and accounted for the largest share of all weather disasters. The public's awareness of climate change is rising as such economic and social damage increases.

Addressing the greenhouse gas reductions provided in the Paris Agreement is also becoming an urgent issue. The ROK's GHG emissions in 2017 reached 709.1 million tons. This figure has been growing at an average annual rate of 3.3% since 1990. Although emissions temporarily declined in some years (they fell from 697 million tons to 691 million tons in 2014), they are again showing an upward trend as a result of increased industrial production and higher energy use resulting from extreme heat and other causes. As is shown in Figure 1, the energy sector, in particular, accounted for 87% of all emissions, growing 2.6 times compared to 1990.

Table 1: Weather-caused damage in the Republic of Korea

Weather disasters in the recent 10-year period		Amount of damage attributed to weather disasters	
Category	Scale of damage	Cause of weather disaster	Total amount of damage (million won)
No. of dead and missing	152	Typhoon	1,587,731
No. of persons affected	202,467	Torrential rain	1,494,031
Inundated area (ha)	35,356	Heavy snow	226,236
Amount of property damage (million won)	3,486,432	High winds or waves	81,712
Damage recovery cost (million won)	7,281,259	Earthquake	96,423

Source: Reconfigured based on the "Second Basic Plan for Climate Change Response"

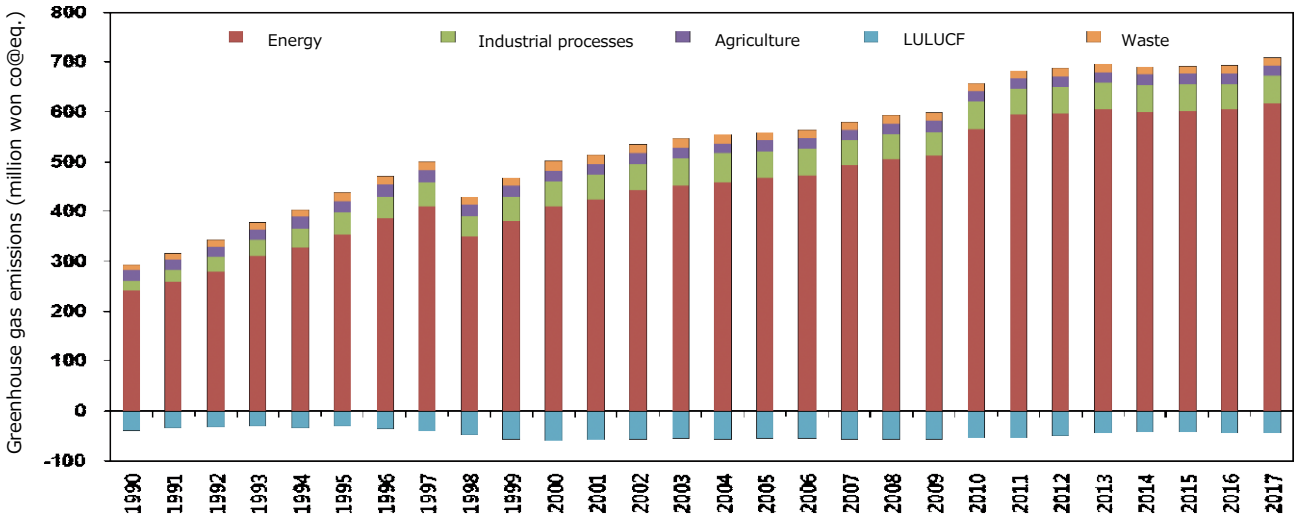

Figure 1: Year-by-year changes in greenhouse gas emissions (2019, National Greenhouse Gas Inventories Report)

Source: The "Second Basic Plan for Climate Change Response"

The government created a cross-ministry/agency system to address climate change in order to respond to damage caused by climate change as well as exert pressure to reduce GHG emissions. Its overall direction was set in accordance with the "green growth" concept put forth by President Lee Myung-bak.

2. Climate change response policy based on the "low carbon, green growth" strategy

The ROK's response to climate change is proceeding with a focus on development that achieves harmony between the economy and the environment. This posture—formalized as "green growth"—was established during the administration of Lee Myung-bak. The concept of "green growth" is one of turning on a new engine for economic development by fostering green technologies and green industries to respond to climate change. This posture is secured by the "Framework Act on Low Carbon, Green Growth," which was enacted and executed during the administration of Lee Myung-bak on January 13, 2010.

A "Green Growth Committee" was set up under the President to formulate main policies and programs associated with the nation's low-carbon, green growth approach under the act and to deliberate matters relating to their execution. The committee's chairperson is a person designated by the President from among the Prime Minister and committee members. The committee's membership is comprised of government officials named in an executive order (such as the Minister of Economy and Finance; Minister of Education; Minister of Environment; and Land, Infrastructure and Transport) as well as experts on low

carbon, green growth that were commissioned by the President.

The committee serves as the top organization in charge of determining the basic direction of low-carbon, green growth policy and formulating, changing, and executing the National Strategy for Green Growth. The committee also formulates the Basic Plan for Climate Change Response, the Energy Master Plan, and the Master Plan for National Sustainable Development, and it handles goal management, inspections, fact-finding studies, and evaluations for promoting low carbon, green growth. As the committee's name suggests, the ROK's climate change response scheme takes a conspicuous posture of focusing on linking the challenges brought by climate change to economic growth through technical innovation.

Additionally, during the same administration of Lee Myung-bak, the ROK led the establishment of the Green Climate Fund (GCF) and launch of its secretariat. It also invited the GCF's headquarters to be based in the ROK. The GCF is an international organization under the United Nations (UN) that provides support for greenhouse gas reductions and adaptation to climate change in developing countries. It is also referred to as the second World Bank. The ROK helped establish the GCF's financial resources by announcing a leading contribution of 100 million dollars to the GCF at the UN Climate Summit held in September 2014. Since then, the ROK has been working to take leadership in addressing climate change in the international community.

3. Comprehensive response by the Second Basic Plan for Climate Change Response

The ROK's policy response to climate change is executed based on the "Second Plan for Climate Change Response (2020-2040)," which was deliberated and finalized by the above-mentioned Green Growth Committee. The plan's objectives are to establish policy direction toward fulfilling the ROK's GHG reduction obligations and response to global warming, and to ensure consistency with related plans in energy and other areas. As is shown in Figure 2, it is the top plan for realizing the green growth national strategy in the climate change sector, and it aims to indicate the direction in which related plans and subordinate plans should be prepared.

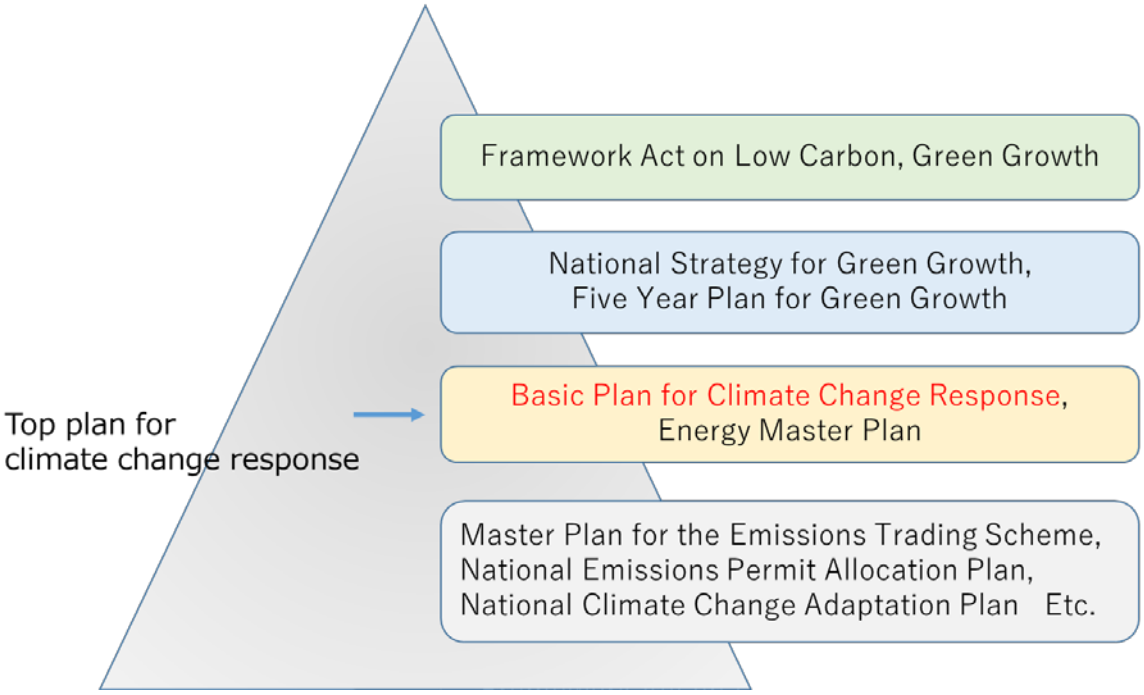

Figure 2: The climate change-related policy scheme

Source: Arranged based on the “Second Basic Plan for Climate Change Response”

The plan was formulated in October 2019. It is a Basic National Plan with an implementation period of 20 years. The first plan was formulated with an implementation period of 2017 to 2036. However, a second plan was quickly formulated to reflect reduction targets and means of implementation that were established in a "National Greenhouse Gas Emissions Reduction Roadmap" that was newly developed in July 2018. As a result, the implementation period for the Second Basic Plan was moved to the years between 2020 and 2040. The plan was formulated based on Article 40 of the Framework Act on Low Carbon, Green Growth.

The current Basic Plan presents three major fundamental challenges. The first is to promote reductions in greenhouse gases toward fulfillment of the Paris Agreement’s target (control of temperature rise to 2°C, efforts toward limiting temperature rise to 1.5°C). The second is to build a climate change response scheme. And the third is to strengthen the nation’s foundation for responding to climate change. Table 2 presents practical strategies and tasks to be executed based on them.

Table 2: Vision and major tasks of the Second Basic Plan for Climate Change Response

Vision	**Realization of a sustainable low-carbon, green society**	
Goals	GHG emissions	709.1 million tons (2017) → 530 million tons
	Better adaptability	Response to 2°C temperature rise by mainstreaming adaptation to climate change
	Foundational development	Capacity building in all sectors to fulfill Paris Agreement obligations

Innovation strategy	**Priority tasks**
Transition to a low-carbon society	1) Promote measures in eight main sectors to achieve national GHG reduction targets 2) Allocate total emission allowance in accordance with national targets and strengthen corporate responsibility 3) Build an inspection and evaluation system for quick and transparent ministry/agency transition
Building of climate change response scheme	1) Improve climate change adaptability in five main sectors (national land, water, ecosystems, agricultural and fishery production, and health) 2) Enhance climate change monitoring/prediction and strengthen adaptation evaluation 3) Achieve mainstreaming of climate change adaptation among all sectors and actors
Foundational reinforcement for climate change responses	1) Create future markets by fostering new technologies and new markets that address climate change 2) Strengthen international negotiation and international cooperation for new climate schemes befitting national stature 3) Raise awareness of climate change among all citizens and spread a culture based on low-carbon lifestyles 4) Build infrastructure for climate change response for institutions, organizations, governance, etc.

Source: The “Second Basic Plan for Climate Change Response”

4. Ocean-related policies for transition to a low-carbon society

The plan establishes policies in eight main sectors to achieve national GHG reduction targets. These policies are positioned as concrete measures toward a transition to a low-carbon society. The eight main sectors are industry, manufacturing (household and commercial), transport, waste, public, agricultural and fishery production, CCUS (carbon dioxide capture, utilization and storage), and mountain forests. The policies among them that concern the oceans are as follows.

1) Transport: Expanding environment-friendly distribution business

It is predicted that the transport sector will account for 12.3% (105.2 million tons) of all emissions in 2030. Thus, particular attention will be given to promoting a modal shift in the current road-centered freight transport system (freight and passengers) toward rail- and marine-based transport, which produces fewer carbon emissions. In the marine transport sector, the introduction of eco-friendly vessels that utilize LNG fuel and efforts to induce orders for private-sector eco-friendly vessels through incentives (subsidies and interest relief) are planned.

The building of Alternative Maritime Power (AMP) onshore power supply systems and creation of infrastructure for expanding their use are also planned, as are efforts to strengthen the management of existing vessels in ways that include optimizing ship designs, using low-friction paints, and improving propeller efficiency. The installation of AMP facilities was completed at Incheon Port's coal wharf, and sequential installation is scheduled for the Incheon Port's passenger terminal, Busan Port, Yeosu Port, Gwangyang Port, and other ports.

2) CCUS (carbon dioxide capture, utilization and storage): Expansion of carbon sinks in the ocean sector

In the CCUS (carbon dioxide capture, utilization and storage) sector, which consists of technologies for reducing carbon dioxide emissions, the plan sets a reduction target of 10.3 million tons by 2030. The policies for achieving this are developing CCUS source and verification technologies, securing CO_2 ocean facilities, and bolstering use of the reduction measures of non-emission source sectors. In particular, efforts will be made to restore mudflat ecosystems and prevent the spread of red tide by creating ocean forests, as well as to restore coastal ecosystems and expand carbon sinks.

There are also plans to promote policies that stress the expansion of "blue carbon." Blue carbon is the carbon stored by plant ecosystems that exist along coasts and tidelands, such as mangroves and other halophytes and seagrass. To expand blue carbon, a systematic management foundation will be created by, for example, conducting fact-finding surveys on

damaged coastal wetlands, building domestic blue carbon information systems, and developing evaluation technologies.

5. Building an ocean-based climate change response scheme

The ROK's climate change response policies for the ocean are implemented under the Ministry of Ocean and Fisheries. The Ministry of Ocean and Fisheries leads the integrated management of marine spaces as well as efforts to strengthen the national management system for ocean environments. Above all, it is worth mentioning that the ministry enacted the Act on Marine Spatial Planning and Management (executed on April 18, 2019) in April 2018 for the integrated management of marine spaces. Under the plan, the ministry aims to formulate spatial plans (continuing an undertaking that started with the southern coast in 2018) up to the eastern coast in 2021 and all ocean areas by 2022. Climate change response policies for the ocean are also scheduled to be implemented in coordination with the Ministry of Ocean and Fisheries' integrated coast management.

According to a national oceanographic survey that was issued in 2018, the ROK's average rate of sea level rise was 2.9 mm/year between 1989 and 2017. This is slightly higher than the global average (2.0 mm/year) that was announced by the Intergovernmental Panel on Climate Change (IPCC) in 2013. In addition, as the sea level rises and extreme weather events occur more often, damage to social infrastructure and facilities—such as ports and harbors, roads, railways, rivers, and seawalls—is increasing. Seventy percent of the cost of damage caused by extreme weather (348.6 billion won between 2008 and 2017) and 74% of damage recovery costs (509.0 billion won between 2008 and 2017) are associated with roads, rivers, and other such public facilities. In light of these circumstances, the current basic plan established the building of an integrated national land/coastal disaster response system and management infrastructure, the elimination of blind spots in disaster information by stimulating citizen participation, and other activities as tasks to be executed.

1) Development of a coastal management system

Steps will be taken to enhance evaluation and analysis of coasts' vulnerability to ocean-caused disasters, and to conserve, restore, or create spaces providing buffer functions (coastal dunes, tidelands, etc.) by preparing maps of anticipated ocean inundation. The coastal management system's development is scheduled to move forward under a third coastal development program (2020-2029) planned for formulation based on the Coastal Management Act.

2) Abnormal weather impact analysis of social overhead capital (SOC)

The execution of impact analyses on performance degradation, facility damage, and other

impacts to infrastructure caused by abnormal weather (e.g., heat waves, high winds, floods, etc.) and preparation of infrastructure hazard maps are planned. Action will be taken to provide performance standards for infrastructure for adaptation to climate change, and to make system improvements to ensure that climate change risk is studied and reflected when conducting reinvestment validity studies for infrastructure.

3) Facility management that takes coastal characteristics into account

The installation of disaster-prevention facilities tailored to the characteristics of coastal regions is planned for key national infrastructure (e.g., ports and harbors, power plants, etc.) as well as fishing port facilities and coastal facilities (e.g., for transport, tourism, leisure activity, access, accommodations, small-scale berthing, etc.). For that reason, the development of key infrastructure will proceed in a manner matched to the impacts of climate change at each port/harbor (e.g., rising sea level, tsunami, etc.), port/harbor redevelopment, and regional characteristics under the 3rd coastal management program (2020-2029) formulated based on the Coastal Management Act.

6. Other matters: Emergence of the PM2.5 problem, nuclear power phase-out policy, and other challenges

The “PM2.5” problem has continued to worsen in recent years and is raising such concern in Korean society as to become an international issue between the ROK and China. Resolving the PM2.5 problem will require special measures in all areas of society, including transport, industry, and daily life. On April 29, 2019, the ROK government officially launched a National Council on Climate and Air Quality as a national response. Reporting directly to the President, the council spearheads domestic and overseas cooperation, listens to the public’s views, and makes proposals to the government toward resolving the PM2.5 problem. Former UN Secretary-General Ban Ki-moon served as the council’s first chairperson. In September of the same year, the council defined a four-month period from winter to spring (December to March) when PM2.5 frequently occurs as the “PM2.5 high season” and issued a domestic policy proposal to promote concentrated reduction management in seven individual fields. The emergence of PM2.5 raised awareness of the need to promote integrated and linked policies for simultaneously reducing PM2.5 and greenhouse gases.

Meanwhile, the administration of Moon Jae-in, which took power in 2017, has advocated a policy of phasing out nuclear power since its beginning. On June 19, 2017, one month after assuming office, President Moon declared at a ceremony held in Busan to proclaim the permanent shutdown of the Kori Nuclear Power Plant’s Kori-1 reactor that “We will fundamentally reexamine our nuclear policy, abandon the policy of nuclear-centered

development, and move to an age without nuclear power." He then moved to completely shelve a plan that was being prepared for the construction of new nuclear power facilities. At that time, President Moon announced that the ROK would reduce nuclear power's share in the energy mix from 30% to 18% by 2030, and replace it by increasing the share of LNG from 20% to 37% and new renewable energy from 5% to 20%. The public's interest in renewable energy naturally rose as a result of this major shift in the ROK's energy policy—namely, the nuclear phase-out policy. However, due to concerns over the ROK's natural environment, development to compensate for nuclear power's termination largely involves LNG and solar power. Increasing criticism of the nuclear phase-out policy as the PM2.5 problem worsens has come to weigh on the government. Those who criticize the nuclear phase-out policy point out that LNG produces more PM2.5 emissions than nuclear power.

As efforts to address PM2.5 and the nuclear phase-out policy become intertangled, the spread of renewable policy remains stagnant. There are concerns that the ROK will have difficulty achieving the GHG reduction targets in the Second Basic Plan for Climate Change Response if energy conversion does not proceed as planned. Some argue that, in order to achieve the GHG reduction targets, the nation should completely reexamine its nuclear phase-out policy and pursue an energy mix comprised of nuclear power and renewables. Establishing a government policy built on both the long-term challenge of climate change response and the phase-out of nuclear power is a problem the ROK government must resolve going forward.