6. REPUBLIC OF KOREA

6.1 Introduction

Nearly 84% of GHG emissions in ROK are from the energy sector.

The Republic of Korea (ROK, hereafter) is one of the most economically-advanced developing countries in Asia and a member of the OECD, and is ranked as the eleventh largest economy in the world. ROK experienced an average annual economic growth rate of 8.8% between 1986 and 1995. Trade in goods accounted for 66% of GDP in 2002 (World Bank 2004), and rapid growth in trade has been the driving force behind the Korean economy. The mining and manufacturing, and the services industry accounted for 39.1% and 46.8% of the total industrial structure, respectively. In the last two decades, ROK doubled its income per capita to US$ 9,025 in 2001, which is two-thirds of the OECD average. Rapid economic growth and an increase in income per capita have led to a sharp increase in GHG emissions per capita, which have already exceeded those of Japan and the EU. The total GHG emissions increased by 5.2% annually between 1990 and 2001, and CO_2 emissions reached 451 MMt in 2001 (Table 6.1). Consequently, the ROK has thus become the eighth largest emitter in the world (World Bank 2004).

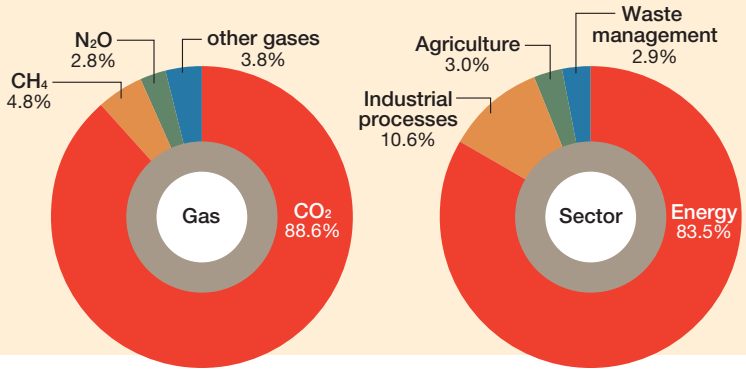
Of all GHG, CO_2 emissions were largest and the energy sector was the largest source of emissions (Fig.6.1). Most CO_2 emissions occur from fuel combustion, mainly attributed to power generation and the transport sector. Given the expectation of the continuous economic growth of ROK, its GHG emissions are projected to rise by 70% above 2000 levels by 2020 (UNFCCC 2005g).

Table 6.1 Key statistics for ROK

Population (2004)		48.1 million
Annual Population Growth (2004)		0.48%
GDP (Current US$) (2004)		US$ 679.7 billion
GDP per capita (2004)		
	Current US$ (2004)	US$14,131
	Purchasing Power Parity (2004)	US$20,371
GNI per capita (Atlas Method) (2004)		
	Current US$ (2004)	US$13,980
	Purchasing Power Parity (2004)	US$20,400
Annual GDP growth (2004)		4.60%
Energy demand (2002)		203 million Mtoe
Per capita energy consumption (2002)		4,271.58 kgoe
Per capita electricity consumption (2002)		6,171.14 kWh
Energy mix (2002)	Fossil Fuel	84%
	Nuclear energy	15%
	Traditional biomass and other renewable sources	1%
GHG Emissions (2001)		508.7 million $MtCO_2e$
GHG Emissions per capita (2000)		11.18 $MtCO_2e$
CO_2 Emissions (2001)		450.7 million $MtCO_2$
CO_2 Emissions per capita (2000)		9.08 $MtCO_2$
CO_2 Emissions per GDP (2000)		0.83 kg/US$

Sources: UNFCCC (2005g), World Bank (2005), IEA (2005)

Figure 6.1 Distribution of GHG emissions from ROK in 2001



Source: UNFCCC, 2005gx

6.2 Major Domestic Climate Policies and International Contributions

The ROK has taken various policies and measures related to energy conservation and GHG reduction. In 1998, the government established the Inter-ministerial Committee on the Convention on Climate Change chaired by the prime minister. The two three-year comprehensive National Action Plans (NAP) had been adapted in 1999-2001 and 2002-2004, and the third NAP (2005-2007) was recently prepared. A summary of selected GHG mitigation and adaptation policies and measures are shown in Table 6.2.

6.2.1 GHG mitigation polices

About 84% of the total GHG emissions in 2001 came from the energy sector, such as fuel consumption and fugitive emissions. Hence, the reduction of the GHG emissions in the energy sector is of utmost importance. On the other hand, most of the energy policies in the ROK have been formulated to enhance the national

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energy security and the improvement of efficiency in energy consumption for achieving sustainable development. Such concerns on energy security provide the basis for policy direction of GHG mitigation. Another important policy area is transportation. With a rapid increase in economic growth and per capita income, the demand for transportation has been rising and is expected to grow sharply. The share of transportation in the final energy demand is projected to rise from 20% to 23.1% between 2001 and 2020 (Yoo 2004).

Table 6.2 Major domestic climate policies

	Issue	Policies and Measures
MITIGATION	Energy efficiency improvement	• Energy efficiency standards and labels
		• Minimum energy performance standards
	Promotion of renewable energy (RE) and other alternative energy	• Preferential purchase of the electricity produced by RE sources
		• Promotion of landfill gas recovery and use
		• Promotion of district-heating or gas heating system
		• Promotion of the combined heat and power (CHP) and waste-incineration heating
		• Nuclear energy
	Transportation	• Supply of CNG buses
		• Promotion of alternative fuels for vehicles
	Technology initiatives	• Clean coal technologies
	Other initiatives	• Domestic emissions trading scheme
ADAPTATION	Natural resources management	• Policies to support adaptation measures, such as cropping pattern change and varietal improvement
	Infrastructure management	• Policies to support assessment and countermeasures for the impact of sea-level rise on coastal zones • Reinforcement of disaster and disease prevention measures

6.2.2 Adaptation polices

The negative impacts of climate change on agriculture, forestry and fisheries, the coastal and marine environment, terrestrial ecosystem, and human health are increasingly perceived as a serious threat to the ROK. Various policies and measures to counter such impacts are being taken in each corresponding sector.

6.2.3 International contributions

The ROK is an active participant in international climate negotiations. For example, it had proposed unilateral CDM as one of the market-based mechanisms that could promote voluntary GHG reduction activities by non-Annex I countries (Kim 2000). The CDM Executive Board accepted the notion of unilateral CDM in February 2005.[1]

ROK contributed to international discussions on climate regime and proposed the concept of unilateral CDM.

The ROK actively initiated and was involved in technology transfer programmes on bilateral, regional and multilateral basis. For example, since the mid-1990s, the Korea International Cooperation Agency (KOICA) has provided energy conservation-related and forest management-related training programmes with other developing countries, such as China, Viet Nam, Nepal and Kazakhstan (Table 6.3). It also launched a series of bilateral technology cooperation with major countries, including Australia, China, and Japan, in the areas of renewable energy and fuel cells. The ROK participated in the USA-led Climate Technology Partnership to facilitate an energy auditing technique and energy service companies (ESCO) as well as methane recovery and utilisation technologies. In addition, the ROK has been playing an active role in technology cooperation at the regional level (e.g. APEC) and at the multilateral level (e.g. IEA).

Table 6.3 Status of KOICA training programmes

KOICA training programmes on energy conservation & utilisation efficiency									
	1995	1996	1997	1998	1999	2000	2001	2002	Total
Country	11	9	10	9	14	14	14	11	42*
Number of Persons	21	18	18	17	20	19	19	31	163
KOICA training programmes on forestry management & desertification prevention									
Country	--	13	11	8	11	11	11	21	29*
Number of Persons	--	13	19	15	19	16	17	32	131

* Overlapping countries are counted only once.
Source: ROK's National Communication, 2003.

[1] See para 57 of the report of the CDM EB at its 18th session (23-25 February 2005).

6.3 Assessment of the Current Climate Regime from the Korean Perspective

Participants in our consultations agreed that the entry into force of the Kyoto Protocol and launch of market-based mechanisms were major achievements of the current regime. As of October 2005, the ROK hosted five CDM projects which were either under or after the validation process. In our consultations, participants pointed out several problems of the current CDM: complexity of methodology; complex approval process, uncertainty, and adverse selection. Non-CO_2 CDM projects create more CER than CO_2 CDM projects, and also methodology for CO_2 CDM is much more complicated. As a result, CDM investments are prone to be concentrated on projects with low costs regardless of environmental benefits.

6.4 Major Concerns on the Current and Future Climate Regime

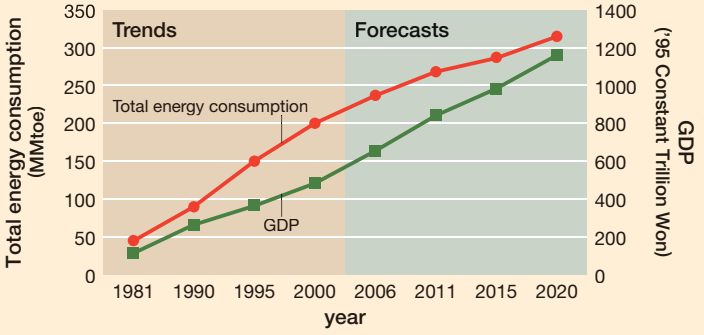
6.4.1 Developmental concerns

ROK is concerned about its energy security and is unclear on how and to what extent climate change and international climate regime will adversely affect its sources and supply of energy.

Related to economic development, the ROK has a keen interest in further economic growth and a major concern on energy security. At our consultation, policy priority for the economic development and energy issues, rather than climate policy itself, was observed. This is one of features in common with other developing countries of the region. Although the ROK has achieved rapid economic growth and industrialisation in the last few decades, it is still thirsty for growth (Fig. 6.2). While its primary energy consumption was estimated at 198.4 MMtoe in 2001, ranking it the tenth largest energy consuming nation in the world, it imported 97.2% of the total energy consumed (UNFCCC 2005g). Securing an energy supply and meeting growing demand for energy are major challenges. The ROK, therefore, has great concerns on how and to what extent climate change and the international climate regime will adversely affect the sources and supply of energy.

In addition, there was also a concern on the negative impact of additional climate measures on the competitiveness of its industry. The key industries of the ROK that have contributed to its rapid economic growth are energy-intensive, including shipbuilding, steel, chemical, and oil refining industries. Other important industries, including semiconductors, electronics and auto manufacturing, also emit GHG directly or indirectly. The mining and manufacturing industries accounted for 39.1% of the Korea's total industrial structure (UNFCCC 2005g). Therefore, further mitigation policies are likely to have profound implications for these industries. While the importance of moving toward a low carbon society was generally recognised, it was not clear to many participants how and when the ROK could go in that direction.

Figure 6.2 Trends and forecasts for energy consumption and GDP in the Republic of Korea



Sources : Korea Energy Economics Institute 2002a, Korea Energy Economics Institute 2002b.

6.4.2 Equity concerns

ROK's GHG emissions levels are roughly the same as those of Italy and Canada and its GHG emissions per capita have exceeded those of the EU and Japan. International pressure is mounting on the ROK to accept some form of GHG emissions control commitments in the future climate regime. The central concern of the ROK is how to design relevant commitments. Participants felt that it would be difficult for the ROK to agree to a fixed, quantified target of GHG mitigation at this stage, because unlike many Annex I countries with matured economies, the ROK still faces shifting economic situations and the difficulty in predicting future GHG emissions. Still, some other methods, such as a CO_2 intensity target and other types of dynamic targets that allow the economic growth in nature, might be worth examining (Kim and Baumert 2002).

ROK is currently facing strong international pressure to accept some form of emissions reduction commitments.

6.4.3 Market-based mechanism-related concerns

It was argued that the eagerness for a unilateral CDM by the ROK was driven by incentives to bank CERs for the future (Zhang 2001). However, the participants in our consultation mentioned that the ROK government recently became reluctant to accept or push for unilateral CDM. ROK, as a member of the OECD, is currently facing international pressure to accept emissions reduction commitments. Furthermore, among the developing countries, the ROK already reached a relatively high level of energy efficiency, so that there are not many so-called "low-hanging fruits" left anymore.

6.4.4 Technology-related concerns

With the growing concern on climate change, the R&D strategies have played a leading role in developing a less energy-intensive and environmentally-sound economic structure in the ROK. The promotion of new innovative technologies, including renewable energy, is considered along this line of strategy. However, the share of RE in the ROK accounted for just 1% of the total energy supply. Table 6.4 shows that the high cost of renewable energy and its low profitability is still a major obstacle to wider dissemination (Korea Energy Economics Institute 2002a). In particular, a key challenge is to develop integrated approaches for the research, development, and deployment of new and renewable energy technologies, introducing them to an increasingly liberalised market.

Table 6.4 Cost of electricity-generating (won/kWh)

Oil	Bituminous coal	Nuclear	Photovoltaics	Wind	Wastes
60	38	34	700	103	150

Source: Korea Energy Economics Institute, 2002a.

6.4.5 Adaptation-related concerns

There is a growing interest in adaptation in the ROK. Indeed, the third NAP identified adaptation as one of the crucial issues. However, participants pointed out that that effective research on vulnerability assessment was limited in the ROK so far. The lack of policy-relevant information on the vulnerability to climate change, both at the global scale in general and the Korean Peninsula in particular, was seen as a major bottleneck to the formulation of appropriate adaptation policies. The Korea Environment Institute (KEI) has just started a three-year project on adaptation. Compared with the issues of industrial competitiveness and economic growth, it was felt that the ROK showed less interest on adaptation issues in general.

6.4.6 Other concerns

Participants noted that the contribution of the ROK to the international scientific processes on climate change, particularly to the IPCC, was very limited. Measures for improving the international recognition of ROK scientists and experts were therefore considered crucial.

There were some discussions on the design of domestic climate policy. An optimal policy mix to reduce GHG emissions in a cost-effective way could include, for example, a domestic emissions trading scheme, the utilisation of the Kyoto mechanisms, and tax policies. However, still synergies between different policies were often lacking, and the assessment of policy impacts was considered inadequate.

6.5 Priorities for Restructuring the Climate Regime

6.5.1 Market-based mechanisms

Several ideas have been proposed to strengthen CDM in future climate regime.

Related to the restructuring of the CDM, the following issues were pointed out:

- Technical capacity building for the current CDM scheme: The concepts of additionality and baseline-setting remain big challenges, so better guidelines and capacity-building for the Korean industry were considered vital to successful implementation of the CDM.
- Unilateral CDM: Unilateral CDM was initially thought to become a good incentive for the Korean industries (Kim 2000), but it is unclear whether unilateral CDM could be still attractive and favourable. In most developing countries, generally speaking, obstacles to a unilateral CDM are to secure financing of projects and buyers of CERs. For the ROK, however, the problem of getting project finance domestically may not be so serious. Unilateral CDM could also minimise transaction costs and it could be integrated into a national sustainable development strategy (Jahn, et al 2003). If the ROK finds an incentive to bank CERs for the future, a unilateral CDM can still be an attractive option.
- Policy-based CDM: The perspectives on policy-based CDM (Bosi and Ellis 2005) were mixed. On the one hand, it was considered that the baseline setting would be difficult, and that it could lead to an over-supply of CERs which would cause a decline in CER price. Without stricter rules, policy-based CDM would be more harmful than helpful. On the other hand, several participants argued for policy-based CDM, and even called for its implementation within the first commitment period on condition that stricter baseline criteria and screening process would be introduced. They argued that a market with only project-based CDM would have more problems than the case of policy-based CDM, and that the baseline issue should be resolved in either case.
- International financing mechanism: Participants suggested that a financing mechanism like the one created under the Montreal Protocol should be considered. Under such a financing mechanism, Annex-I countries could pool the money, purchase CERs and meet their commitments.

6.5.2 Technology issues

The role of technology in tackling climate change should be more explicitly emphasised in the future climate regime. The ROK spends a relatively large 3 per cent of the national income on R&D (OECD 2005) and has initiated a series of R&D projects to direct the Korean economy towards a less energy-intensive and more environmentally-sound structure. At the same time, the ROK is engaged in international cooperation to transfer technologies to other developing countries and partnerships with developed countries to develop innovative technologies. Participants felt that a technology-centred future climate regime would potentially benefit ROK, since it could have more opportunities for acquiring new innovative technologies from developed countries and deploying their technologies in other developing countries.

6.6 Epilogue

The ROK is currently facing international pressure on how to advance its future commitments. Several principles for future regime discussions should be considered. They are:

- First, the principle of common-but-differentiated responsibilities needs to continue in the future regime.
- Each country's national circumstances and concerns need to be incorporated in designing the future regime. Since nuclear energy has already become so important in terms of energy security, the ROK needs to appeal to the global community regarding the necessity of using nuclear options for meeting the energy needs of the future.
- Flexibility of the future climate regime should be enhanced, particularly for enabling the participation of developing countries.
- Sustainable development is a legitimate concern for everyone. The Asia-Pacific region has other urgent issues, like poverty alleviation and social development; the region, in general, is neither ready nor willing to work on the climate issue now. For the future regime to be successful, it should start from the sustainable development angle, rather than directly from climate concerns.
- Region-specific climate strategies in North-East Asia in particular should be considered as part of the international negotiations.

The principle of common but differentiated responsibilities should continue to be the basis of future climate regime.