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## KOREA'S LOW-CARBON GREEN GROWTH STRATEGY

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## PREFACE

The year 2008 marked a milestone in the last 50 years of Asia's economic development history. A process of "rebalancing growth" in many Asian emerging and developing countries began in the aftermath of the 2008 financial crisis. This is not just a matter of shifting from exports to domestic demand as an engine of growth. Investment in social infrastructure and green technologies provides an important source of growth in times of economic slack. In this context, Asian governments, most notably Korea, are pursuing serious efforts to search for a new model of development based on social inclusion and environmental sustainability. In other words, this involves moving away from the traditional export-led growth that is heavily dependent on fossil fuels as the dominant source of energy. This is more easily said than done as it leads to the ultimate question of how the economy and society should be organised in the next 20 to 30 years. Current national and international initiatives to promote "green growth", the special theme of the second edition of the *Southeast Asian Economic Outlook*, need to be (re-)framed in this regional context.

The main thrust of green growth in the Asian context is to help exploit new sources of growth through national and sub-national efforts to foster energy conservation and renewable energy development, promote green technologies and products and upgrade infrastructure services needed to support environmentally sound and sustainable lifestyles. This working paper co-authored by three Korean environmental economists looks at the three principal pillars of Korea's low-carbon green growth strategy: regulations to reduce greenhouse gas emissions from industries, incentive mechanisms for businesses to develop green technologies and products, and public information tools to increase awareness of and demand for green products. Korea's quest for a low-carbon green growth path provides important lessons and useful insights for other countries in the region.

This working paper was prepared as background material for Chapter 5 of the *Southeast Asian Economic Outlook 2011/12*. This volume has taken a regional approach to the *OECD Green Growth Strategy* and has identified several areas of interest to policy dialogue between OECD member and Asian partner countries, including environmental taxation, emissions trading and carbon labelling. It is hoped that this volume will contribute to a better understanding of Asia's green growth challenges in the years to come.

Mario Pezzini  
Director  
OECD Development Centre  
12 March 2012

## RÉSUMÉ

Ce document analyse la stratégie de croissance verte à faible intensité de carbone de la Corée en examinant plus particulièrement trois éléments : les régulations pour réduire les émissions de gaz à effet de serre de l'industrie ; les mécanismes d'incitation pour les entreprises à développer les technologies et les produits respectueux de l'environnement ; et les outils d'information publics pour sensibiliser l'opinion publique et accroître la demande de produits respectueux de l'environnement. Dans une économie mondiale sous contrainte carbone, la transition de la Corée vers une croissance verte à faible intensité de carbone peut servir de point de référence pour bon nombre de pays en développement. L'institutionnalisation de la stratégie de croissance verte à faible intensité de carbone bénéficiant d'un large soutien politique et soutenue par des programmes de mise en œuvre détaillés est essentielle pour résoudre les défis socio-économiques et environnementaux que posent le paradigme classique de la croissance fortement énergivore et consommatrice de ressources naturelles, parmi lesquelles les énergies fossiles. Un partage efficace des rôles et une coopération suivie entre les acteurs publics et privés dans le processus de planification, de préparation du budget et de mise en œuvre sont des composantes majeures de la stratégie de croissance verte à faible intensité de carbone de la Corée.

**Classification JEL:** Q01, Q28, Q58

**Mots clés:** croissance verte, économie à faible intensité de carbone, technologies respectueux de l'environnement, produits respectueux de l'environnement

## ABSTRACT

This paper examines Korea's low-carbon green growth strategy with a focus on three pillars: regulations to reduce greenhouse gas emissions from industries; incentive mechanisms for businesses to develop green technologies and products; and public information tools to increase awareness and demand for green products. Korea's transition to a low-carbon green growth path may provide a useful reference for many developing countries in a carbon-constrained global economy. The institutionalisation of a low-carbon green growth strategy supported by strong political leadership and elaborated implementation programmes is key to solving many socio-economic and environmental challenges posed by the traditional growth paradigm that is heavily dependent on the consumption of energy and natural resources, including fossil fuels. Efficient role sharing and co-operation among public and private stakeholders in the process of planning, budget preparation and implementation are major components of Korea's low-carbon green growth strategy.

**JEL Classification:** Q01, Q28, Q58

**Keywords:** green growth, low-carbon economy, green technologies, green products

## I. INTRODUCTION

The success story of the Korean economy hides another story of which most developing countries are unaware: the continuous pressures of environmental degradation and external shocks from the world economy.

Since the late 1990s, the resource shortage and loss of growth momentum in the Korean economy has cast serious doubts on the sustainability of the country's conventional export-oriented growth. In 2008, in response to these doubts, Korea implemented a low-carbon green growth strategy emphasising the role of technological progress and innovation to spur new growth. The government then introduced a set of policies and measures to put the strategy into practice. The institutional base of Korean green growth began with the establishment of the Presidential Committee on Green Growth (PCGG) as headquarter of policy promotion. Additionally, in 2009, the government introduced the Five Year Green Growth Plan for 2009-2013 and the Framework Act on Low Carbon Green Growth.

National and international experts invited by the Korean government identified several challenges that later formed the basis of a new low-carbon green growth strategy. First, excessive energy-dependency on imported fossil fuels leaves few alternatives in terms of energy security for Korean industry, which is further threatened by increasing worldwide demand for fossil fuels. Furthermore, Korea has doubled its greenhouse gas (GHG) emissions in the past 15 years, and suffered more from global warming than the global average in terms of temperature increases and rising sea level. Finally, international market conditions have become less favourable to Korean industries with the emergence of economies like China and India possessing abundant labour and natural resources.

To overcome these challenges, Korea elaborated a new socio-economic development strategy composed of three policy objectives: reduction of GHG emissions and increasing energy security; creation of new growth engines through green technology innovations; and transition to more environmentally sound and sustainable lifestyles. The following describes Korea's experience in implementing these new policies.

## II. REGULATIONS TO REDUCE GHG EMISSION FROM INDUSTRIES

In the elaboration of its new socio-economic development strategy, the Korean government took a view that a new growth engine could be derived from low-carbon green growth opportunities. This vision implies creating growth opportunities from engagement in the development of a low-carbon socio-economic structure. Furthermore, it aims to contribute to the global efforts to combat climate change by moving towards low carbon-intensive development paths.

### II.1. Current emissions and their projection

#### *Current emissions*

The greenhouse gas inventory of Korea, categorized by sector and gas type, is shown in the following tables. Currently, six greenhouse gases (CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, HFCs, PFCs, SF<sub>6</sub>) figure in the Kyoto Protocol. The Korean government has made an inventory of these six gases available. Total gross emissions of GHGs increased to 620 million tons<sup>1</sup> (tCO<sub>2</sub>eq, of carbon dioxides equivalent) in 2007, from 305.4 million tons in 1990. This amounts to an average annual increase of 4.3% for the entire seventeen-year period, while aggregate GHG emissions have more than doubled.

As shown in Table 1, the main sources of emissions are energy, industrial process, agriculture, and waste. The energy sector bears the heaviest responsibility for the increase. In 2007, it accounted for 84.7% of total GHG emissions, while industrial process accounted for 10%.

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1. In this section, unit of GHG inventory is tCO<sub>2</sub>eq, of carbon dioxides equivalent.



**Table 1. Trend in GHG emissions/removals (1990~2007)**  
(Unit: million tCO<sub>2</sub> eq)

	1990	2000	2005	2007	1990-2007 (% change)
Energy	247.8 (81.1)	438.8 (82.1)	498.9 (83.6)	525.4 (84.7)	4.5
Industrial process	19.9 (6.5)	58.3 (10.9)	64.8 (10.9)	60.9 (9.8)	6.8
Agriculture	15.2 (5.0)	20.6 (3.9)	18.2 (3.1)	18.4 (3.0)	1.1
Waste management	22.5 (7.4)	16.7 (3.1)	14.7 (2.5)	15.3 (2.5)	-2.2
Gross emissions	305.4 (100)	534.4 (100)	596.7 (100)	620.0 (100)	4.3
Forest/Land use change	-23.7	-37.2	-32	-36.3	2.5
Net emissions	281.6	497.1	564.7	583.7	4.4

Note: ( ) indicates the share of the total.

Source: Korea energy statistics information system, <http://www.kesis.net/>

The uptake of GHGs through forestry and land-use changes was 36.3 million tons in 2007, accounting for about 5.8% of total gross emissions.

Table 2 shows GHG emissions by gas type indicating that the share of CO<sub>2</sub> was largest (89.4%), followed by CH<sub>4</sub> (3.9%) and N<sub>2</sub>O (1.9%) in 2007.

**Table 2. Emissions by major gases (1990~2007)**  
(Unit: million tCO<sub>2</sub> eq)

	1990	2000	2005	2007	1990-2007 (% change)
CO <sub>2</sub>	257.7 (84.4)	466.1 (87.2)	526 (88.2)	554.6 (89.4)	4.6
CH <sub>4</sub>	43.8 (14.3)	29.1 (5.4)	23.8 (4.0)	24.4 (3.9)	-3.4
N <sub>2</sub> O	3 (1.0)	16.9 (3.2)	20.8 (3.5)	11.7 (1.9)	8.3
Total	305.5 (100)	534.5 (100)	596.7 (100)	620.1 (100)	4.3

Note: ( ) indicates the share of the total. Total includes HFCs, PFCs, SF<sub>6</sub>.

Source: Korea energy statistics information system, <http://www.kesis.net/>

Table 3 shows main indicators on energy related CO<sub>2</sub> emissions, caused by the combustion of fossil fuels such as coal, oil and natural gas. In 2007, energy-related CO<sub>2</sub> was responsible for 83.7% of total gross emissions, with 518.7 million tons. Since energy-related CO<sub>2</sub> makes up 93.5% of the total, it is customary to ignore other sources when analysing CO<sub>2</sub> in general.

Average annual growth of energy-related CO<sub>2</sub> was 4.6% between 1990 and 2007. Per capita CO<sub>2</sub> emissions almost doubled from 5.6 tons in 1990 to 10.7 tons in 2007. Carbon intensity, defined as CO<sub>2</sub> over energy, decreased at an average annual rate of 1.0% over the same period.

**Table 3. Main indicators of energy-related CO<sub>2</sub> emissions (1990~2007)**

	1990	2000	2005	2007	1990-2007 (% change)
CO <sub>2</sub> (A) (mil. tCO <sub>2</sub> )	242.2	434.4	493	518.7	4.6
Population (thousand)	42,869	47,008	48,138	48,456	0.7
Energy (B) (thousand toe)	93,192	192,887	228,622	236,454	5.6
Per capita CO <sub>2</sub> emissions (ton of CO <sub>2</sub> )	5.65	9.24	10.24	10.70	3.8
Carbon intensity (ton/toe) (A/B)	2.6	2.25	2.16	2.19	-1.0

Note: % indicates the average annual growth rate.

Source: Korea energy statistics information system, <http://www.kses.net/>

### Projections of energy-related CO<sub>2</sub>

Table 4 discusses emission projections of energy-related CO<sub>2</sub>. One reason for this focus is that energy-related CO<sub>2</sub> makes up the largest part of GHGs, with 83.6% of the total gross emissions and 93.5% of the total CO<sub>2</sub> in 2007. Another reason is the relationship of energy-related CO<sub>2</sub> to macroeconomic variables, where GDP and population are the two most important determinants. For this projection, GDP is assumed to increase 4.0% from 2010 to 2020 and 3.5% from 2020 to 2030. Population is assumed to increase only at 0.1% up to 2020 then to decrease after 2020, with 48.3 million, 50.0 million, and 49.3 million in 2005, 2020, and 2030 respectively (Statistics Korea, 2010)<sup>2</sup>

CO<sub>2</sub> from energy usage is projected to increase from 493 million tons of carbon dioxide (tCO<sub>2</sub>) to 790 million tCO<sub>2</sub> between 2005 and 2030, with an average annual increase rate of 1.9%.

2. The population was projected to be 49.956 million in 2020 and 49.329 million in 2030 in the "Long-term Estimation of Population" by Statistics Korea (2010).

Table 4. Major Indicators of Energy-related Carbon Dioxide Projection (2005-2030)

	2005	2010	2020	2030	(%)			
					'05~'10	'10~'20	'20~'30	'05~'30
CO <sub>2</sub> emissions (million tCO <sub>2</sub> )	493	568	676	790	2.9	1.8	1.6	1.9
Per capita CO <sub>2</sub> emissions (tCO <sub>2</sub> /person)	10.2	11.5	13.5	16.0	2.4	1.6	1.7	1.8
CO <sub>2</sub> /Energy (tCO <sub>2</sub> /TOE)	2.16	2.17	2.06	1.97	-0.1	-0.5	-0.4	-0.4

Note: % indicates the average annual growth rate. Figures for 2010 are not observed data but projected data.

Source: Korea Energy Economics Institute (2006). "Study on Long-term GHG Projection."

Average annual increase rates are 2.9%, 1.8% and 1.6% between 2005 and 2010, between 2010 and 2020 and between 2020 and 2030, respectively.

Per capita CO<sub>2</sub> emissions are expected to increase from 10.2 tonne (tCO<sub>2</sub>/person) in 2005 to 11.5 tonne, 13.5 tonne, and 16.0 tonne in 2010, 2020, and 2030 respectively. Carbon intensity, defined as CO<sub>2</sub> divided by energy use, is expected to decrease at an average annual rate of 0.4%.

## II.2. Regulations and measures in place and planned

### *Adoption of mid-term GHG reduction goal and measures*

One of the most important decisions the Korean government made in framing the low carbon green growth initiative was to adopt the mid-term GHG Korea reduction goal. On November 17, 2009, the government formally adopted the voluntary mid-term GHG reduction goal which means a 30% emissions reduction from the business-as-usual (BAU) level by 2020. Non-Annex I countries (mostly developing countries) are not required to set a legally binding reduction target under the Climate Convention and this goal is the most ambitious of the Non-Annex I countries, .

Korea's reduction strategy advances two agendas. First, Korea wants an early grasp of global mitigation opportunities. Second, setting a reduction target sends a strong signal to domestic industries and consumers. Industries are expected to develop an advantage in the world market for low-carbon technologies.

Formulating the goal was difficult. Industries saw adoption as a cost burden and worried about loss of international competitiveness. They considered mitigation costs only over the short term. Systematic government modelling and analysis took place over the year after the declaration of low carbon green growth vision in August 2008. Various national research institutes carried out a GHG emission projection up to 2030 derived from main economic variables such as GDP, population growth and world oil prices. The mitigation potential of various industries was also analysed. Macro economic impacts were considered using a computable general equilibrium (CGE) model. Three goals were formulated and reviewed; namely 21%, 27%, and 30% emissions reductions by 2020.

The 30% reduction goal is to be pursued by technological and regulatory means. Technological measures include greening of buildings and construction of highly energy-efficient factories. The transportation system will move towards low carbon system. Generation of new and renewable energy is to increase from the current levels (2.4% in 2007) to 4.3% in 2015, and further to 6.1% in 2020, and 11% in 2030. Plans to expand nuclear power plants will both reduce CO<sub>2</sub> emissions and develop new export opportunities. The government will build 12 new additional nuclear power plants to complement the existing 20 units while decreasing coal consumption.<sup>3</sup> Finally the government will also facilitate development of Smart Grid and carbon capture and storage technology (CCS) and intensify development of next-generation green cars, opening new technological opportunities for the country via strong demand-side management (DSM) measures.

On July 2011, the government announced BAU emission reduction goals by sector. (Table 5). GHG emissions in Korea should peak in 2014 in order to accomplish the 30% reduction goal by 2020. This is seen as an enormous challenge in Korea.

**Table 5. Reduction Goals from BAU by Sector in 2020**  
(Unit: %)

	Industry	Transport	Building	Agriculture, Forest, Fishery	Waste	Public	Total
Reduction Rates	18.2	34.3	26.9	5.2	12.3	25	21.6 <sup>a</sup>
							30.0 <sup>b</sup>

Note: a) indicates average reduction for six sectors.

b) indicates average reduction including transformation sectors such as the power generation sector.

### *Adoption of target management system*

Technological measures alone cannot ensure that the goals are reached. The adoption of regulatory policy measures, in particular, a target management system, an emissions trading system, and carbon tax measures, signal the Korean government's determination.

The target management system (TMS) was implemented by the Ministry of Knowledge Economy responsible for industry, energy, and trade in consultation with industrial sector stakeholders.

Under the TMS, the government is a principal player in setting up reduction targets, unlike the voluntary agreement system used in Japan. Under TMS, agreed-upon targets become mandatory. The Government provides incentives and imposes penalties. Large emitters are regulated under this system; at a factory level, those emitting more than 25 000 tons (tCO<sub>2</sub>) were regulated in 2011. Factories emitting more than 20 000 tons will be regulated in 2012. In 2014, coverage will be expanded to include factories emitting more than 15 000 tons. Levels over the previous three years are used in calculating average emission of a factory. As of end of year 2010,

3. In 2008, the government adopted The Fourth Basic Plan for Electricity.

468 companies were designated as target companies who together were responsible for 58% of national GHG emissions in 2007.

The government will provide massive assistance to targeted companies. Financial assistance through the Energy Service Company (ESCO) will be expanded threefold from USD 125 million in 2010 to USD 360<sup>4</sup> for the installation of energy-efficient and low-carbon facilities, of which the government subsidises up to 50%. 90% of energy auditing expenses are provided to small- and medium-sized companies. Loans and tax exemptions are provided for the installation of energy efficient, low carbon facilities.

### *Adoption of emissions trading system*

The government sent the draft Act on GHG emissions trading systems to parliament in February 2011, requiring the implementation of an emissions trading system beginning in 2015. An entity that emits less GHG than allocated can sell the surplus to another emitter in the GHG trading market. An entity emitting more than allocated must buy GHG credits to meet its allocated target. A market-friendly instrument, the trading of GHG allocations is the cheapest means of arriving at GHG reduction.

The market determines the price per ton of GHG but also provides an important signal to companies on cutting their GHG emissions. Different from levying a carbon tax based on carbon content, the trading system is designed in view of application to the entities which produce GHGs. According to the emissions trading act, about 95% of the reduction requirement will be allocated free of charge over the first planning period while excess emissions will be penalised three times more than the market carbon price. The system also allows banking over planning periods. The emissions trading system is expected to be implemented in 2015, and will draw on experience from the target management system which will be fully operational in 2012.

A draft act on the GHG emissions trading system requires the first planning period for emission trading to begin in 2015, with an end date to be determined by presidential decree. The second planning period will last three to five years and will be determined by subsequent presidential decree as well. At the outset, the Korean government wished to embark on a trading system beginning in 2013. Industry, however, wanted more experience before implementing a full trading system, so the date was moved to 2015.

### *Carbon tax considered*

Until recently, Korea had not incorporated carbon pricing in its energy price system, though the government has controlled energy prices for a long time out of consideration for maintaining the international competitiveness of its industries. Currently, taxes levied on the transportation sector are lighter than those on industry. Since 83.4% of greenhouse gases are emitted from the energy and industrial sectors, it will be necessary to introduce a carbon tax in the Korean energy price system.

Korean carbon taxes have been discussed in both policy arena and academia since the 1990s; however, the government has not yet adopted one owing to the heated political debate that doing so would provoke. Revenue could be used to finance development of energy-efficient

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4. 1 USD = 1.082 Korean Won (KRW, June 2011).

carbon-saving technologies. Recent analysis of carbon taxation proves that reinvestment of the revenue into industries such as renewable energy enables recovery of a part of GDP lost to GHG reductions (Sang In Kang and Jaejoon Kim (2007)).

### *Measures to expand renewable energy*

The current share of new and renewable energy is only 2.5% in Korea, which is much lower than those of the EU, U.S. (5.7%), and Japan (3.4%). The Korean government's goal is to increase the share of new and renewable energy to 4.3% in 2015, 6.1% in 2020, and 11% in 2030. To do so, a feed-in tariff (FIT) system and renewable portfolio system (RPS) have been implemented.

The feed-in tariff (FIT) system substantially expanded the market for renewable energy beginning in January 2002 by compensating differences between costs of generating electricity from renewable energy and baseline generation costs. The cost of solar photovoltaic electricity is as high as 710 KRW per kilowatt and 108 KRW for wind (whose baseline generation costs is much less). Subsidies based on FIT amounted to USD 243.1 million for 1,503 Giga-watt hour of electricity generation in 291 units in 2009. Solar photovoltaic accounts for 92% of this subsidy. Thus FIT subsidy created substantial incentives to expand solar energy in Korea.

To compensate for the rapid increase of subsidies, the government will change its focus from FIT to a renewable portfolio system (RPS). RPS sets obligatory target shares of renewable generation for each power generation company. Such companies will be able to produce electricity from their own renewable sources or else buy renewable energy certificates from the market. RPS will replace FIT in 2011.

### *Energy efficiency measures*

The Korean government has utilised various regulatory measures to enhance energy efficiency. Voluntary agreements, introduced in 1998, have been replaced by a target management system, more obligatory in nature. The government is encouraging energy supply companies to develop demand-side management (DSM) and energy efficiency resource standard (EERS) programmes.

The government adopted many energy efficiency rating and labelling programmes, including programmes for condensing boilers and window fittings. In addition, CO<sub>2</sub> emissions labelling will be applied to 17 home appliances, such as refrigerators, washing machines, and fluorescent lamps. The minimum energy performance standards will be expanded to include three-phase electric motors, adapters, and chargers. The use of incandescent bulbs will be banned by 2013.

In spite of the enhanced efforts dedicated to climate change mitigation, Korea has not yet overcome the industry resistance to carbon pricing mechanisms like carbon taxes or emission trading.

### *Lessons learned*

In spite of the enhanced efforts dedicated to the climate change mitigation, Korea has not yet made a decisive breakthrough in introducing a proper carbon pricing mechanism such as a carbon tax or emissions trading, due to the objection raised by various stakeholders.

But there has been progress in the reduction of GHG emissions from fossil energy use in major sectors such as power generation and transportation, chiefly the newly introduced renewable portfolio system (RPS) that has replaced feed-in tariffs and target management systems (TMS) as an interim measure toward emission trading..

There continues to be much debate on the adoption of a carbon tax at the same time as an emission trading system (ETS), since in theory the two measures could have the same final mitigation result. The government notes that the ETS is to be applied for the major GHG emission producers on the supply side and, as a result, its impact on consumer choice for low carbon products could be quite limited. The government's position is that the introduction of a carbon tax on products in demand would complement rather than duplicate ETS.

### III. INCENTIVES FOR BUSINESS DEVELOPMENT OF GREEN TECHNOLOGIES AND PRODUCTS

Korea put technologies in the first line of its industrialisation and economic development strategy. Innovation with new technologies always took top priority in private and public decision making to overcome economic crises including consecutive 'oil shocks' in 1970s and the Asian financial crisis in 1998. In the same perspective, green technologies became a strategic response to the last global economic crisis in 2008.

Green technology includes basically technologies for energy and resource use efficiency, for climate change mitigation and adaptation, and for environmental pollution management. It covers not only the traditional clean technologies focusing on the pollution abatement but also new technologies providing advanced materials and processes less harmful to the health and environment.

#### III.1. Green technology initiatives

##### *Profiles of green technology*

There have been several technological policy breakthroughs in the Korean green growth initiative: 17 New Growth Engines, a master plan promoted by the Presidential Council for Future and Vision (PCFV) and the Ministry of Knowledge Economy (MKE); 27 Core Green Technologies, a master plan for green technology R&D presented by the National Sciences and Technology Council (NSTC); and, 15 Green Energy Technologies identified in the policy responses to the climate change and global warming (Table 6).



Table 6. Technologies in the Korean green growth strategy

17 New Growth Engines (PCFV, 2009)	Green Technologies(27) (NSTC, 2009)	Green Energy(15) (MKE, 2009)
-Renewable Energy	-High Efficiency Low Cost Silicon-based Solar Cell -Non Silicon-based Solar Cell Production Technologies -Bio-energy Production Related Technologies and Systems -High Efficiency Hydrogen Creation and Storage Technology -Next Generation, High Efficiency Fuel Cell Technology -High Efficiency Secondary Battery Technology	-Photovoltaic Panel -Wind -Fuel Cell -Clean Fuel -Energy Storage
-Low Carbon Resource Industry (CO <sub>2</sub> Capture)	-Carbon Capture and Storage (CCS) Technologies -Non CO <sub>2</sub> Manufacturing Process	-Carbon Capture and Storage
Low Carbon Resource Industry (Nuclear Energy)	-Technologies for Advanced Light Water Reactor Construction -Technologies for Eco-friendly Non Proliferating Fast Reactor -Technologies for Design and Construction of Fusion Reactor	-Nuclear Energy
-Advanced Water Treatment	-Technology for Water Quality Management and Assessment -Technology for Alternative Water Resources -Monitoring of Harmful Substances/ Environmental Cleansing	
- Light Emitting Diode (LED) Appliances	-LED lighting, Green Information Technology (IT)	-Light Emitting Diode
-Green Transportation	-High Efficiency, Low Pollution Vehicle Technologies	-Green Car
-Cutting Edge Green City	-Ecosystem and Green Rehabilitation	
-Information Technology (IT) Fusion System	-Power IT and Technology for Enhancing Efficiency of Appliances	-Power IT -Super conduction
-Broadcast, Communications Fusion Industry -Robot Applications -New Materials, Nano Fusion -Bio-pharmaceuticals/Medical Equipment -High Value-added Food Industry		
-High Value-added Medical Service -Global Education Service -Green Finance -Cultural Contents & Software -Convention & Tourism	-Virtual Reality Technology	
	-Technology for Eco-friendly, Low Energy Buildings	-Building Energy
	-Technology for Integrated Coal Gasification Combined Cycle(IGCC)	-IGCC
	-Climate Change Prediction and Modelling -Climate Change Effects Assessment and Adaptation -Waste Reduction, Reuse Technology -Green Process with Low Environmental Load and Energy Use -Eco-friendly Plants Cultivation Catalyst Technology -Intelligent, Transport System	
		-Small Cogeneration -Heat Pump

Sources: Presidential Council for Future and Vision (2009), National Science and Technology Council (2009), Ministry of Knowledge Economy (2009).

In March 2008, the government commissioned a working group composed of about 300 experts from research institutes, business, and academia. In September 2008, the working group identified 22 new technologies in six industrial sectors (energy and environment, transportation, information technology, fusion, bio-technology, knowledge-based services) and proposed a development plan. The Presidential Council for Future and Vision (PCFV) finalised the proposal, now called the Master Plan for 17 New Growth Engines in January 2009 (PCFV (2009)). The Ministry of Knowledge Economy (MKE) conducted further planning for the 10 technologies under its authority. The MKE planned to invest about USD 6.7 billion for the next five years and to induce further investment of USD 83.6 billion from the private sector.<sup>5</sup>

MKE also set up a separate R&D and investment plan for the green energy industry in 2009 (MKE 2009). MKE selected 58 products and 207 related core technologies of strategic importance. The plan considers strategic R&D guidelines for the selected technologies and a roadmap for their commercialisation.

The National Sciences and Technology Council (NSTC) focused more specifically on establishing a master plan for R&D in the upstream of those industrial sectors (NSTC 2009). After consultation with experts, NSTC identified 75 candidate technologies and made a comprehensive analysis of each technology's potential for economic growth, environmental sustainability, and strategic importance to future technological progress. NSTC selected 27 core green technologies meriting priority R&D investment and commercialisation.

The government has set strategic priorities with the idea that for Korea to compete with advanced and emerging economies, it is essential to develop a comprehensive series of advanced technologies within major industrial sectors to act as economic growth engines. The strategy groups 27 technologies into 5 thematic categories:

- Alternative energy sources, which allow replacement of fossil fuel with renewable, low-carbon energy sources;
- Efficiency enhancement of existing fossil-fuel energy and promotion of efficient use of electricity to reduce pollution;
- Reduction resource use and provision of greener spaces by innovating manufacturing process and improving landscape management practices;
- Environmental protection and resource recycling, including technologies that can predict environmental changes, assess environmental impacts, control environmental pollutants, and rehabilitate ecosystems;
- Migration of manufacturing processes to lower carbon and greener methods.

As the Framework Act Low Carbon Green Growth (FALCGG), enacted December 2009, states in an article: "Green technologies help minimise emissions of greenhouse gases (GHGs) and other pollutants through the development of greenhouse gas reducing technology, increasing energy efficiency, developing clean manufacturing processes, clean energy and promoting comprehensive, socio-economic efficient use of energy and resources."

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5. The investment schedule of MKE in Korean won is converted into US dollar with the exchange rate of 1 082 Korean Won per USD, the rate as of June 2011.

### Investment schedule for green technology

Over the short-term, investment focuses on three core technology projects which can be quickly realised: silicon solar cells, advanced light-water reactors, and LED. Over the medium-term it focuses on 8 economically feasible core technology projects to secure early market-mover advantage: highly efficient, low emission vehicles; green process with low environmental load and energy use; secondary batteries; non-CO<sub>2</sub> manufacturing processes; water quality management systems; alternative water resources; waste reduction; and virtual reality. Over the long-term, investment will be in 13 projects with potential to evolve into pioneering technologies of the future. They include R&D in: prediction of climate change; impact assessment and adaptation to climate change; fast reactors; fusion reactors; hydrogen energy; fuel cells; environmentally friendly vegetation growth; Integrated Coal Gasification Combined Cycle (IGCC); urban regeneration; eco-friendly buildings; smart grids; carbon capture and storage (CCS); and management of hazardous substances. The government has adopted a more long-term investment base in grand scale concerning non-silicon solar cells, bio energy, and intelligent transport systems.

Table 7 compiles R&D investment schedules for green technologies. It shows the current status of technology development with actual investment and future mid-term targets. Compared to the total national R&D investment increase from USD 10.26 to USD 11.37 billion (10.8%) over the same period, the increase in green technology R&D (40.0% for overall green technology and 35.1% for 27 core green technologies) confirms the remarkable change in policy priorities since the launch of Korean Green Growth Initiative.

**Table 7. Green technology investment schedule (2008-12)**  
(Unit: billion USD)

Category		2008	2009	2010	2011	2012	Note
National R&D	Target	10.26	11.37	12.66	13.77	15.34	
Green Technology R&D	Target (Weight, %)	1.29 (12.6)	1.76 (15.4)	2.03 (16.1)	2.31 (16.8)	2.59 (16.9)	19% (annual growth rate)
	Planned	1.35	1.89	2.14	2.43	2.75	
Core Green Technology R&D (27)	Target (Weight, %)	0.92 (71.7)	1.29 (72.0)	1.57 (77.3)	1.85 (80.0)	2.13 (82.1)	23.4% (annual growth rate)
	Planned	0.97	1.31	1.65	1.94	2.26	

*Note:*

This table is based on reports of "10 Year Plan for Green Technology R&D" submitted by related government agencies. The planned figure for 2008 and 2009 represent actual R&D investment realised, and the figure for the years of 2010-2012 represent planned investment adjusted to the target proposed.

1 082 Won per USD is applied to convert Korean won into U.S. Dollar equivalent from the original data in the source MEST(2010).

Source: MEST (2010).

R&D investment in 2010 amounted to USD 2.14 billion, 5.4% more than the proposed target. In 2012 an investment of USD 2.98 billion is expected which is much higher than the proposed target of USD 2.59 billion. The trend continues through 2013 (PCGG 2009b). Small- and medium-sized enterprises (SMEs) have also been taken into consideration. All told, green technology investment represents about 25% of total government R&D investment. Korea expects to nearly catch up developed countries' technological advances and to generate 481,000 new jobs by 2012.

### *Role sharing and co-ordination among bodies*

Korea has established a strong role-sharing and co-ordination system (Table 8) to avoid wasted effort among R&D programmes all led by different ministries.

The National Science and Technology Council sets R&D investment priorities, assesses the adequacy of investment in each area, and co-ordinates the various actors. Allocation of R&D budget to each technology is controlled by the council. The Ministry of Strategy and Finance (MOSF) prepares the public R&D budget in accordance with the council's assessment.

**Table 8. Role sharing in green technology R&D co-ordination**

PCGG	NSTC	MOSF
Allocation Principles for Green R&D Budget (early or mid of July)	Allocation Principles for Gov't R&D Budget (late July)	Compilation of Gov't R&D Budget
-Expansion of investment in Green R&D	-Investment priorities by areas/projects	-Drawing up the government's R&D budget, reflecting the assessment of NSTC
-Investment priorities by major technologies	-Adjustment between projects	
-Adjustments between relevant projects	-Investment suitability and feasibility	
-Division of roles between industries by technologies	-Division of roles between ministries	

Sources: NRCS 2011.

The Green Technology Joint Committee, composed of NSTC and PCGG, co-ordinates and reviews overall budget allocations and expenses. It consists of 10 members from PCGG and NSTC, who serve jointly as the main secretariat of the joint committee. The Presidential Committee on Green Growth (PCGG) directs green R&D investment, their expansion, and prioritisation. It adjusts and connects relevant programmes and actors and assigns roles to agencies and ministries. Inter-ministerial R&D programmes are led jointly by agencies and ministries. They are quite useful to the development of technologies in need of broader support.

### *Commercialisation strategy for green technology*

The Korean government also works to expand infrastructure facilitating commercialisation of technology. After consultation with public policy research institutions, the government drew up a commercialisation strategy for core green technologies. It made a comprehensive analysis on the market potential and competitiveness for each of 27 technologies, and identified measures and tools for technology development commercialisation (Table 9).

Table 9. Commercialisation strategy for green technologies

Stage	Outcome	Tasks
Analysis of Conditions	-Analysis of Changes in Market Conditions and Forecast	-Identifying the Major Issues Relating to Technology Development -Market Forecasts
	-Analysis on Competitiveness	-Analysis of Market Competitiveness(Level of Technology, Price Competitions, etc.), Competitiveness in Global Stage -Domestic and International Conditions, Other Domestic Issues
Establishment of Strategy	-Setting the Strategic Direction	-Setting the Direction for Commercialisation of Technology (Testing, Prototypes, etc.) -Ultimate Goal for Given Technology
	-Drawing up the Strategic Roadmap	-Strategy for Crucial Technologies, Strategic Products, Technology Acquisition, Role of Private & Public Sector -Commercialisation Strategy after Technology Development
	-Investment Strategy and Foundation	-Investment Direction for Technology -Human Resources Training, Regulation Reform -Establishing Policy Infrastructure from R&D to final commercialisation
	-Expected Effect and Future Direction	-Analysing the Effects from Commercialisation and Providing Future Direction

Sources: GGGI 2011.

A detailed analysis was made of issues such as possible future societal change, expected megatrends in future technology, and other development-related issues including population, sustainability of growth, environmental pressure, economic/environmental balance, technology fusion, and value & norms. It was found that all the 27 core technologies would provide useful solutions.

Upstream development of source technology and strengthening of development channels from pilot test-bed production to full-size commercial production were proposed to enhance the competitiveness and commercialisation of Korean green technologies. Joint research ventures and international standardisation of technology for some selected sectors such as nuclear fusion, climate change prediction, intelligent transport systems, smart grids and hydrogen energy sources were proposed to strengthen international co-operation.

For its core technologies the PCGG estimates that the global market share stood at USD 1.5 trillion in 2007. It estimates the market's value will rise to USD 5.7 trillion by 2020. The domestic market was USD 37 billion in 2007 and will grow to USD 230 billion by 2020 (PCGG 2009a). The expected economic effect in terms of value-adds from development and commercialisation is estimated at USD 108.1 billion by 2020, or a seven-fold increase of the 2007 figure. In terms of job creation, the government estimates that there would be 1.18 million more jobs by 2020, a five-fold increase from 2007.<sup>6</sup>

6. This induced employment effect includes direct and indirect employment increases resulted from the investment to green technology and industry, which amounts to 99.3 billion USD during 2009~2012 (PCGG 2009c).

### *Institutional support*

One of the main technology development challenges for is limited access to the financial investment due to the high uncertainties and the prolonged payback period of R&D. The government has introduced the Green Certificate System to attract sufficient financing. A demand-oriented supporting mechanism allows individuals and business groups easier access to development funding. The green certification system certifies technologies and projects developed by private entities (Table 10).

**Table 10. Green certificates in Korea**

Number of cases (Number of firms), as of 10 September, 2010				Review Results	
Category	Applications	1 <sup>st</sup> Phase (Documentation)	2 <sup>nd</sup> Phase (Review)	Qualified	Not-Qualified
<b>Green Technology Certificate</b>	331(244)	108(92)	99(88)	78(51)	46(41)
<b>Green Business Certificate</b>	40(36)	22(21)	7(6)	1(1)	10(10)
<b>Green Certified firms</b>	23(23)	4(4)	12(12)	6(6)	1(1)
<b>Total</b>	394(267)	134(113)	118(103)	85(51)	57(49)

Source: KEITI(2011).

Green certification offers incentives to producers to improve their products and encourages researchers to develop new technologies. Certification reduces uncertainty so financiers are more inclined to focus on green business. Furthermore, consumer decisions are better informed.

In November 2009, PCGG, MKE, Ministry of Environment (ME) and the Small and Medium Business Administration (SMBA) developed a management model to support the greening progress of the *private sector*. Collectively, they categorized 39 green businesses into five categories: Strategy, System, Resource/Energy, GHGs/Environmental Pollution, and Social/Moral Responsibility. The government is still in the process of implementing a Green Business Management Certification System to develop comprehensive standards for green business management in Korea and in the hope of expanding it into an ISO standard.

Special attention was given to small and medium enterprises (SME). Considering SMEs' difficulties in transitioning to green business, the government has set up a specialised capacity-building programme. A Small and Medium Enterprises Green Management Support Group, composed of both civilian and government experts, was created to provide technical support for SME adoption of green management practices. A Green Service Mall where SMEs can receive online training or consulting services for green management, was also created

The Korean Chamber of Commerce and Industry (KCCI) set up the Green Business Management Headquarters in March 2010 with a view to facilitating partnerships and private sector-based transition towards green business.

The Green Technology Network (GTNET, [www.gtnet.go.kr](http://www.gtnet.go.kr)) was established in December 2009 to integrate existing green technology information systems of 8 public institutes. The network provides practical information on core technologies, basic technical information, industry and market analysis, policy action, and R&D and roadmap progress. The network

compiles information from different sources into a single database named the National Science and Technology Information Service (NSTIS).

## Financial incentives

The Five-Year Green Growth Plan specifies various green finance policies to facilitate green investment. It promotes mobilisation of public credit for green technology and industry through public financial institutions such as the Korea Development Bank, the Industrial Bank of Korea, the Korea Credit Guarantee Fund and the Korea Technology Finance Corporation. Also, in performance evaluations for financial institutions, the government recommended the inclusion of a financial institution's achievement in providing advantages for green loans. The government also developed green financial indicators such as a stock index related to the environment and rating systems for green companies.

In September 2009, following these governmental initiatives, The Korea Exchange (KRX) developed a socially responsible investment index (SRI) based on the evaluation of nonfinancial factors such as sustainability, environmental and social governance (ESG) in selected leading companies. The government has a plan to develop a green industry stock index, as a new form of investment for index funds.

Furthermore, the government expanded financial support for green business projects handled by energy service companies (ESCO).<sup>7</sup> ESCO provides energy conservation retrofit services on outdated facilities and recuperates its investment in saved energy bills. Financial support through ESCO recorded USD 103.0 million in 2008 and increased to USD 121.9 million in 2009. The government also plans to provide increased tax credits for small- and medium-sized energy-saving companies.

Financial incentives are prepared throughout the different phases of green business development: R&D, commercialisation, growth and maturity. During the R&D phase, public credit is prioritised and for the commercialisation phase, fund of funds<sup>8</sup> is the main tool for facilitating investment, especially for the small- and medium-sized companies. During the growth phase, public equity funds, long-term loans, and bonds with preferred tax rates are the major financial instruments for green companies. Finally, at maturity, a variety of tools including carbon-based financial instruments, green SRI, green industry index, and green insurance are employed.

Many commercial banks also offer preferred rates for the savings account of customers who practice eco-friendly lifestyles by using public transportation or by purchasing eco-products with a special credit card linked to the account. Banks have also donated to green projects and environmental groups based on their record of hosting green savings accounts.

As of February 2010, the scale of domestic bank loans for green business and projects was estimated as USD 5.27 billion, which amounted to 0.59% of the total bank loans. The total deposit

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7. Through ESCO services introduced in 1993, a total of 3,158 energy conservation projects received USD 1.2 billion of investment by 2008.

8. A "fund of funds" is a fund holding a portfolio of other investment funds rather than investing directly in shares, bonds, or other securities.

in green accounts is estimated at USD 8.96 billion, amounting to 1.29% of total savings. The current account of green investment funds under the name of green, renewable, solar, SRI, etc., is estimated around USD 1.11 billion, or 1.23% of the total domestic investment fund deposit. (KIF 2010)

To create an early market for green products, the government introduced a mandatory eco-friendly product procurement scheme to public institutions. A total of 821 institutions are subject to the Act on Encouragement of Purchasing of Environment-friendly Products enacted in December 2004. These institutions include state organisations, local governments, public enterprises, local public enterprises, and local research institutes. If all affiliates of the above institutions are included, the total number reaches approximately 26 400.

The government also operates the Public Procurement System for Minimum Green Standard Products, also called the Minimum Green Standard. In many cases, government procurement serves as one of the direct incentives contributing to the early mover's entry into the green market. Once innovative products are judged to have a social benefit, the government becomes an early adopter and a test bed for the product prior to general market release. Government procurement supports public confidence in the relevant business and, as a result, creates brand value and vitalises the market. In fact, the Minimum Green Standard in the public procurement system is a most practical incentive for green product producers. Only the products that satisfy these requirements are able to transact business on the Korea On-line E-Procurement System. In the 2010 work plan, public procurement set the following annual green product procurement targets: USD 2.77 billion (2011), USD 3.23 billion (2012) and USD 3.70 billion (2013). The government plans to increase the number of products subject to the Minimum Green Standard up to 100 products by 2013 (PPS 2010).

### Green procurement

To create an early market for green products, the government has introduced a mandatory eco-friendly product procurement scheme to public institutions. A total of 821 institutions are subject to the 'Act on Encouragement of Purchasing of Environment-friendly Products' enacted in December 2004. The 821 institutions include state organisations, local governments, public enterprises, local public enterprises, local research institutes, etc. If the number of organisations affiliated with the above institutions is included, the total number reaches approximately 26,400.

The government is also operating the 'Public Procurement System for Minimum Green Standard Products' called "Minimum Green Standard". In many cases, government procurement contributes to the early mover's entry into the green market. Once the government has identified an innovative product as having social benefit, it can take on the role of an early adopter and a test-bed for the product prior to market release. Government procurement can enhance public confidence in relevant business fields and as a result create brand value and stimulate the market.

The Minimum Green Standard in the public procurement system is composed of environmental standards such as standby electricity, energy consumption efficiency, and recycling, etc. Only the products that satisfy these requirements are able to transact business on



the Korea On-line E-Procurement System. The standard provides a strong incentive for green product producers in the market.

A total of 31 product standards, including computers, cars and so on, were introduced by September 2010. The Minimum Green Standard demonstrates a higher level of product quality requirements compared to the general product certification standard in Korea. This is in order to expedite green technology development by corporations and strengthen competitiveness. In the work plan of 2010, the public procurement services set the following annual targets for green product procurement: USD 2.77 billion (2011), USD 3.23 billion (2012) and USD 3.70 billion (2013). At the same time, the government also has a plan to increase the number of products subject to the Minimum Green Standard up to 100 products by 2013 (PPS, 2010).

## IV. PUBLIC INFORMATION TOOLS TO INCREASE AWARENESS AND DEMAND FOR GREEN PRODUCTS

### 4.1. Low carbon green life initiatives

Promotion of green lifestyle is one of the ten policy targets of the Five Year Green Growth Plan. The government supports various green life initiatives to promote low-carbon green growth by providing incentives and supporting systems as well as practical green information to enhance awareness of the public on the green life style in consumption (Table11)

Table11. Low carbon green life initiatives

	Green Start Initiative	We Green Initiative	Green Energy Family Initiative
<b>Launching</b>	August 2008	April 2009	May 2009
<b>Objective</b>	Reduce GHG in daily life to realise a Green Growth and Low Carbon Society	Overcome Economic Crisis & Move toward Low Carbon Green Growth Society	Low Carbon Green Life with energy saving and improved energy efficiency in production, commerce and consumption chains
<b>Organisation</b>	Local public-private networks of Civil societies, Press, Businesses, Trade unions, etc. supported by 224 local governments. <a href="http://www.greenstart.kr">http://www.greenstart.kr</a> supported by Ministry of Environment	Led by 600 NGOs including Women organisations, Parents-teacher organisations, and Association of residents, etc. <a href="http://www.wegreen.or.kr">http://www.wegreen.or.kr</a> supported by Ministry of Gender Equality and Family	12 Regional Implementation Family Network composed of local governments, NGOs and 158,000 individual members (as of September 2011) <a href="http://www.gogef.kr">http://www.gogef.kr</a> supported by PCGG, Ministry of Knowledge Economy

Sources: PCGG (2011).

### Green growth education module

The Ministry of Education, Science and Technology (MEST) and the relevant authorities developed policy measures to promote green growth education. At the elementary and secondary school level, the government enhanced the regular green growth curriculum, and designated specialised green-growth education and training centres to raise student awareness of the green life style. At university and adult education level, the government supports the green campus movement, implementing green growth lifelong education, opening green growth education programmes for social leaders, and spreading the green lifestyle movement (Table 12).

Table 12. Policies on green growth education

Sectors	Policies
Elementary and Secondary Education	Developing and institutionalising green growth curriculum
	Developing green growth school text books
	Establishing training system for teachers of green growth education
	Designating and operating leading green growth education centre
	Connecting green growth education inside and outside the school
University and Nationwide Lifelong Education	Fostering university education for green growth
	Building educational foundation for nationwide green lifestyle
Globalisation of Green Education	International social co-operation towards green growth education

Source: GGGI (2011).

Associated with MEST, the Korea Foundation for the Advancement of Science and Creativity established a task force on green growth curriculum development in line with the notification of curriculum amendment in December 2009.

### Tools for green consumption

As one of the essential tools to provide consumer information and to promote green consumption, the government has introduced eco-labelling systems since 1992 (Table 13).

Table 13. Korean eco-labelling systems

Types	Acts
Eco-labelling (Type I)	Development and Support for Environmental Technology Act
Environmental Self-regulation (Type II)	Act on Fair Labelling and Advertising
Environmental Declaration of Products (Type III)	Development and Support for Environmental Technology Act

Eco-labelling (Type I) is a system whereby producers voluntarily employ verifiable measures that significantly reduce the harmful effects of their production processes and products. It provides consumers with exact environmental information on the product while calling on producers to develop and produce goods that meet the eco-consumption patterns. Korean eco-labelling system is subject to the management of both the Ministry of Environment and the Korea Environmental Industry & Technology Institute (KEITI).

The introduction of the Producer's Environmental Self-regulation System (Type II) allows manufacturers, importers, distributors, and retailers to assert the environmental superiority of their products without certification of an independent third party. This system provides various forms of environmental information to consumers, but the absence of third-party certification allows for the inclusion of information that is not fact-based. This method could be seen as "green washing" which is a way of making a profit by building an eco-brand image without meeting ecological standards.

The Environmental Declaration of Products System (Type III) is based on the life-cycle environmental impact assessment of the product. The assessment quantifies use of natural

resources and pollutants produced and the environmental effects of the pollutant over the product life-cycle. Results are displayed numerically and with graphs on the product. The system facilitates consumer choice of environmental products and greatly contributes to eco-friendly product manufacture. By displaying the exact environmental information on easy-to-read and transparent labels, it induces market-driven environmental improvement.

As of August 2010, Korean eco-labelling was applied to 143 product categories and a total of 7,655 products are now certified with eco-labels. The Korea Environmental Industry & Technology Institute (KEITI) reported that the total number of eco-labelled products reached 8 042 in January 2011 (KEITI 2011). The sales of eco-label products reached USD 15.71 billion by 2008 with an increase of 17.2% compared to USD13.40 billion in 2004. A survey conducted in March 2010 on public awareness of eco-products revealed that consumer awareness of eco-labelling came to 39.3%, showing a 30.5% point increase compared to 8.8% in 2007.

The government introduced two kinds of carbon footprint labelling in February 2009 to promote consumer-led purchasing patterns of low carbon goods and to encourage enterprise to develop low-carbon technologies. The carbon footprint labelling is not a mandatory certification system; businesses participate on a voluntary basis. There are two levels of certificates: carbon footprint certification label (level 1) and low carbon product certificate (level 2). The first indicates the actual level of a product's carbon emission displayed numerically. After the first level, the producer can agree to a carbon emission target. Once the target is achieved, the producer gets the second type of carbon label, indicating that the product is indeed a low-carbon product (see Figure 1 as of July 2011, a total of 418 products from 88 firms have received carbon footprint labels).

Figure 1. Two types of Korean carbon footprint labelling



Source: KEITI.

## The National Green Technology Awards

The 'National Green Technology Awards' reward more directly pioneering green technologies on a sector-by-sector basis and contribute to increasing public awareness on the importance of green technology innovation. The award was developed jointly by the Ministry of Education, Science and Technology (MEST), the Ministry of Food, Agriculture, Forestry and Fisheries (MIFAFF), the Ministry of Knowledge Economy (MKE), Ministry of Environment (ME) and the Ministry of Land, Transport and Maritime Affairs (MLTM).

In considering candidates for these awards, ministries evaluate the performance, economic feasibility, commercial value and practical applicability of green technologies developed by corporations, universities and research institutes. Different tiers of awards include: a Presidential Award; Prime Minister's Award, the Education, Science and Technology Minister's Award; the Food, Agriculture, Forestry and Fisheries Minister's Award; the Knowledge Economy Minister's Award; the Environment Minister's Award and the Land, Transport and Maritime Affairs Minister's Award. The first Presidential Award was given to LG Chemicals for its High Output, High Energy Lithium-Polymer Battery Technology in February 2010.

## CONCLUSION

It is well known that the industrialisation strategy based on a quantity-oriented, expansionary growth paradigm has brought about widespread environmental degradation and depletion of natural resources. Developing a new, more sustainable growth strategy represents one of the most urgent challenges the Korean economy faces today. The solution lies in implementing an environmentally sound and sustainable economic growth model under which innovations and state-of-the-art technologies play a key role as engines of growth.

In this regard, the Republic of Korea, a country that overcame endemic poverty and emerged as one of the major global economies, adopted green growth as a new national development strategy. Since then, the Korean government has introduced various policies and measures to convert this vision into action. The institutional base of 'Korean Green Growth' is composed of the 'Five Year Green Growth Plan' covering the years of 2009 to 2013 and the 'Framework Act on Low Carbon Green Growth'.

This paper has examined the three distinguished pillars of the "Green Growth": regulations to reduce GHG emissions from industries; incentive mechanisms for businesses to develop clean technologies and green products; and public information tools to increase awareness and demand for green products. These pillars represent the core policy directions to accomplish the "Low-Carbon Green Growth".

In the past, regulatory measures have been micro in nature and sector-specific. Demand-side management is used in the electricity sector. Energy-efficiency standards are applied to specific appliances. Energy efficiency labelling programme is utilised for specific home appliances. The energy performance standards have been expanded to include houses. These micro and sector-specific regulations have been effective in many areas.

Achieving a low-carbon green growth path, however, requires more macro, cross-cutting, and system-wide instruments, including measures that are strong enough and economy-wide in nature to transform high-carbon, resource-wasteful systems. Realising the urgency of structural changes, the Korean government is introducing economy-wide regulatory measures. At the centre of these measures are the adoption of national GHG reduction targets, preparation of an emissions trading system by 2015, and consideration of a carbon tax. These measures would have far reaching impacts on the whole economy and society. These three measures would constitute a functional carbon pricing mechanism.

Carbon pricing is the most effective measure to transform a carbon-intensive economy. Adopting national targets and introducing an emissions trading system or carbon tax in a country is no easy task, whether for advanced or developing countries. Yet, these measures are the surest way to see results.

In establishing the green growth agenda, the role of government is instrumental. The Korean government adopted a top-down approach in this respect. The government took the most high-level initiative and established the Presidential Committee on Green Growth (PCGG) on January 2009. Less than seven months after the establishment, the committee formulated the 'National strategies and five-year plan for green growth' on July 2009. It should be noted that the high-level government commitment will be one of the most important factors to secure the success of green growth policy.

Korea put technologies in the first line of its industrialisation and economic development strategy. Investment in innovation and new technologies have also been high priorities for private and public decision makers in overcoming multiple crises, including consecutive 'oil shocks' 1970s and the Asian financial crisis in 1998. Promotion of green technologies has been taken as a strategic solution in overcoming the latest crisis in 2008.

Green growth is based on green technologies. It seeks to achieve simultaneously environmental sustainability and further economic growth amid turbulence in the global economy. Green technology can be understood as a group of technologies including those for conservation of energy and resources, climate change mitigation and adaptation, and environmental pollution management technologies. Green technology covers not only the traditional clean technologies focusing on pollution abatement but also new technologies contributing to the increased energy and resource efficiency by providing advanced materials and processes.

The Korean experience in the R&D investment and commercialisation for green technology demonstrates that the institutionalisation of low-carbon green growth strategy supported by strong political leadership together with elaborated comprehensive programmes is essential to ensuring the necessary technological progress when faced with environmental pressures from climate change and the limits of a quantity-oriented, expansionary growth paradigm. Efficient role sharing and co-operation among public and private stakeholders in the process of planning, budget preparation and implementation of proposed policy programmes also play a key role in the successful accomplishment of the low-carbon green growth targets in the domain of green technologies. In the case of public awareness tools for green life-style change, the quasi-national mobilisation of resources led by various public-private partnerships would provide a demand-side push toward green growth.

## REFERENCES

- E-NATIONAL INDEX (2011), *Eco-friendly Product Purchase*, Seoul, Korea.
- GLOBAL GREEN GROWTH INSTITUTE (2011), *Green Growth in Motion: Sharing Korean Experience*, Seoul, Korea.
- KOREA ENERGY ECONOMICS INSTITUTE (2006), *Study on Long-term GHG Projection*, Seoul, Korea.
- KOREA ENVIRONMENTAL INDUSTRY & TECHNOLOGY INSTITUTE (2011), *Current Status of Eco-labelled products*, Seoul, Korea.
- KOREA ENVIRONMENT INSTITUTE (2009), *Environment Policies for Low Carbon*, Resource Recycling Society, Seoul, Korea.
- KOREA INSTITUTE OF ENERGY TECHNOLOGY EVALUATION AND PLANNING (2010), *Green Energy Strategic Road Map*, Seoul, Korea.
- KOREA INSTITUTE OF FINANCE (2010), *Review of Green Finance No.31* Seoul, Korea.
- MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY (2010), *Report on National Green Technology R&D Activities in 2010*, Seoul, Korea.
- MINISTRY OF ENVIRONMENT (2010), <http://www.me.go.kr>, Seoul, Korea.
- MINISTRY OF KNOWLEDGE ECONOMY (2008a), *Fourth National Basic Plan for the Rational Use of Energy: 2008-2012*, Seoul, Korea.
- MINISTRY OF KNOWLEDGE ECONOMY (2008b), *Third Basic Plan for New and Renewable Energy Technology Development and Dissemination (2009-2030)*, Seoul, Korea.
- MINISTRY OF KNOWLEDGE ECONOMY (2009), *Strategic Road Map to Develop Green Energy Industry*, Seoul, Korea.
- NATIONAL RESEARCH COUNCIL FOR ECONOMICS, HUMANITIES AND SOCIAL SCIENCES (2011), *Green Forum 2010*, volume 4, *Green growth: New Engines of Growth*, Seoul, Korea.
- NATIONAL SCIENCE AND TECHNOLOGY COUNCIL (2009), *Master Plan for Green Energy*, Seoul, Korea.
- PRESIDENTIAL COMMITTEE ON GREEN GROWTH (2009a), *Comprehensive Strategy for Development and Commercialization of Core Green Technologies*, Seoul, Korea.
- PRESIDENTIAL COMMITTEE ON GREEN GROWTH (2009b), *National Strategy and 5-Year Plan for Green Growth*, Seoul, Korea.
- PRESIDENTIAL COMMITTEE ON GREEN GROWTH (2009c), *"Green Job Creation and Training"*, Report of PCGG, Seoul Korea.
- PRESIDENTIAL COMMITTEE ON GREEN GROWTH (2011), *The Right Way to Know about Green Growth*, Seoul, Korea.
- PRESIDENTIAL COUNCIL FOR FUTURE AND VISION (2009), *Master Plan for 17 New Growth Engines*, Seoul, Korea.
- PRIME MINISTER'S OFFICE (2008), *Comprehensive National Action Plan for the Framework Convention on Climate Change*, Seoul, Korea.



PUBLIC PROCUREMENT SERVICE (2010), *Second Designations of Minimum Green Standard Products*, Seoul, Korea.

SANG IN KANG AND JAEJOON KIM (2007), *Recursive Dynamic National CGE Model*, Korea Environment Institute, 2007 RE-07, Seoul, Korea.

STATISTICS KOREA (2010), *Long-term Estimation of Population*, Seoul, Korea.

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