



*Green Thinking
Better Tomorrow*

Policy Handbook for **Sustainable Consumption and Production of Korea** *1st Edition*

Korea Environmental Industry and Technology Institute (KEITI) is a quasi-government organization affiliated with the Korean Ministry of Environment, and committed to achieving environmental protection and economic growth. In order to fulfill the mission, KEITI supports creating environmental technologies, nurturing environmental industries and promoting eco-friendly lifestyle and sustainable consumption patterns. For further information, please visit <http://www.keiti.re.kr/eng/>

This Handbook was developed by KEITI under the research project Asia Sustainable Consumption Production Initiative with funding from the Korean Ministry of Environment.

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Foreword



Over the last half-century, the Republic of Korea has experienced a number of environmental problems including GHG emission and waste generation coupled with economic growth, and adverse effects such as sick building syndrome. In order to address these challenges as well as to nurture a new market for green products and services, the Korean government has introduced a comprehensive policy package since the early 1990s, including ecolabelling, green public procurement, green store certification, and green credit card scheme.

As a result, there are more than 10,000 kinds of eco-friendly products and services available in the market. Designed as an economic incentive scheme to reward eco-friendly behavior, the green credit card is now one of the bestselling credit cards in Korea, attracting more than 9 million card-holders. It is estimated that the purchases of green products by the public sector over the last eight years has resulted in the reduction of 4.2 million tons of CO₂ emission in total.

Building on our experience, the Republic of Korea actively engages in international and regional partnership programs in order to contribute to global sustainability. KEITI joined the board of the 10 Year Framework Programme (10YFP) on Sustainable Consumption and Production (SCP) in 2013, and co-leads the Sustainable Public Procurement Programme, one of the six focus areas under the 10YFP, together with UNEP and ICLEI from 2014. KEITI also serves as the secretariat of the Asian Carbon Footprint Network in partnership with UNESCAP.

Our experience shows that the role of government is instrumental in the establishment of an enabling environment to create a virtuous cycle of green production and consumption patterns. This Policy Handbook has been prepared in order to support policy-makers and practitioners in strengthening the capacity to implement policies illustrated in the Handbook, thereby initiating the shift towards SCP. The Handbook provides a list of policy options for SCP with detailed description on how to implement those policies. I hope this Handbook serves as a practical guideline for policy-makers that wish to benchmark our experiences in introducing and improving such policies.

Yongjoo Kim

President of Korea Environmental Industry and Technology Institute
Board Member of UN 10YFP & Co-representative of 10YFP Asia-Pacific Region

The logo for KEITI (Korea Environmental Industry and Technology Institute) is displayed on a pink, torn-edge paper tag. The logo consists of the word "KEITI" in a bold, blue, sans-serif font, with a green leaf-like graphic element above the letter "I".

KEITI

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The Handbook has been prepared by a group of researchers at KEITI under the direction of Stanley Seungwoo Seok, Director of the Sustainability Strategy Office of KEITI, and coordinated by Hyunju Lee.

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The Green Building Certification (G-SEED) was drafted based on the annual progress report of the G-SEED by the Korean Ministry of Land, Infrastructure and Transport, while the Guideline for Eco-design Applications was edited from a chapter of the eco-design training material of KEITI.

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Acronym and Abbreviation

ACFN	Asia Carbon Footprint Network
EA	Environmental Assessment
EBM	Environmental Benchmarking
GEN	Global Ecolabelling Network
GHG	Greenhouse Gas
GPIP	Green Product Information Platform
GPP	Green Public Procurement
GR	Good Recycled Mark
G-SEED	Green Standard of Energy and Environmental Design
GWP	Global Warming Potential
ISO	International Organization for Standardization
KEITI	Korea Environmental Industry and Technology Institute
KEPA	Korea Environment Preservation Association
KICT	Korea Institute of Civil Engineering and Building Technology
KONEPS	Korea On-line E-procurement System
KONETIC	Korea National Environmental Information Center
KS	Korean Industrial Standards
LCA	Life Cycle Assessment
LCT	Life Cycle Thinking
MOE	Ministry of Environment
MOLIT	Ministry of Land, Infrastructure, and Transport
MRA	Mutual Recognition Agreement
QFD	Quality Function Deployment
SCP	Sustainable Consumption and Production
UNEP	United Nations Environmental Programme
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific

About the Handbook

The Policy Handbook for Sustainable Consumption and Production of Korea is comprised of two sections.

The first section is Policy Handbook, which is divided into three parts, namely Consumer Information; Sustainable Consumption and Lifestyle; and Sustainable Business. Each part contains various policy instruments with detailed and practical guide elaborating basic concept, policy goals, legal basis, major milestones, working mechanism, implementing procedure, strength, challenges, major outcomes and future plans for improvement of the policy. At the end of each policy section, information documents and online website are listed for further reference for readers.

Part 1 incorporates Korea Eco-labeling, Carbon Footprint Labeling, Green Building Certification, and Green Store Certification, which aim to provide information on environmental performances and/or eco-friendliness of products, building and retail store so that consumers can make an informed decision.

Part 2 encompasses policy instruments and activities, including Green Public Procurement, Green Credit Card, and ECO-EXPO KOREA, designed to stimulate and incentivize sustainable consumption and lifestyle.

Part 3 includes policy instruments and incentives such as Eco-Business Award, GREEN-UP, and Eco-Design Program that promote sustainable business practices.

The second section, included in the extended version of the Policy Handbook, provides laws, regulations, and guidelines that underpin the respective policies described in the Policy Handbook as follows:

Sustainable Consumption and Production in General

Act and Enforcement Decree on Promotion of Purchase of Green Products

Korea Eco-labeling

Operational Rule of the Korea Eco-labeling

Carbon Footprint Labeling

Guideline for Carbon Footprint of Products; Regulation on the Operational Procedure of Carbon Footprint Labeling

Green Building Certification

Act on Support for the Establishment of Green Buildings; Regulation on Green Building Certification

Green Credit Card

Guideline for the Operation of the Green Credit Card System

Green Store Certification

Regulation on Operational Process for Green Store Certification

The economic value expressed in Korean won (KRW) is converted as U.S. dollars (USD) at 1000 KRW:1 USD

Sustainable Consumption and Production Policies of Korea at a Glance

The Korea Eco-label is marked on products to indicate relatively low emission levels of environmental pollutants or greater conservation of resources throughout the product's lifecycle in comparison with other products of the same category.

The Carbon Footprint Label is marked on a product to specify the CO₂ equivalent of greenhouse gas emissions generated in the entire lifecycle of the relevant products and services, from production, transportation, distribution, and usage, to the end of product life.

The Green Standard for Energy and Environmental Design (G-SEED) is a green building certification to rate the environmental performance of buildings in Korea, throughout the lifecycle from the production of construction materials, design, construction, maintenance and management to demolition.

Green Public Procurement is a process whereby public organizations meet their needs for goods, services, works and utilities in a way that achieves value for money throughout the entire lifecycle in terms of generating benefits not only to the organization, but also to society and the economy, whilst reducing negative impacts on the environment.

Green Credit Card is an economic incentive scheme that provides economic rewards to credit card users for i) purchasing low-carbon and eco-friendly products, ii) using public transport; and iii) saving utility rates including electricity, water, and gas.

Green Store Certification is a scheme to indicate green stores that facilitate the distribution of green products to consumers and strive to improve the environmental management of the stores. It aims to encourage energy conservation and GHG reduction among retail stores and ensure easy access to green products for consumers.

The Green-Up is a business assistance program to provide environmental management consultations with SMEs aimed at enhancing competitiveness, reducing resource-related costs, and improving environmental performance.

ECO-EXPO KOREA is the biggest environmental exhibition in Korea, featuring various eco-friendly technologies, products, services and other environmental activities of businesses and the government.

ECO-BUSINESS AWARD is a national award to reward businesses, organizations and individuals that contributed to the development of ecological technology and industry; the mitigation of climate change; and eco-friendly consumption and production.

Eco-Design Program aims to provide technical and financial assistance with SMEs in adopting eco-innovation for their products and services. The purpose of the eco-design program is to identify creative and innovative ideas for sustainable products and to assist their commercialization.

Policy Handbook for Sustainable Consumption and Production of Korea

1st Edition



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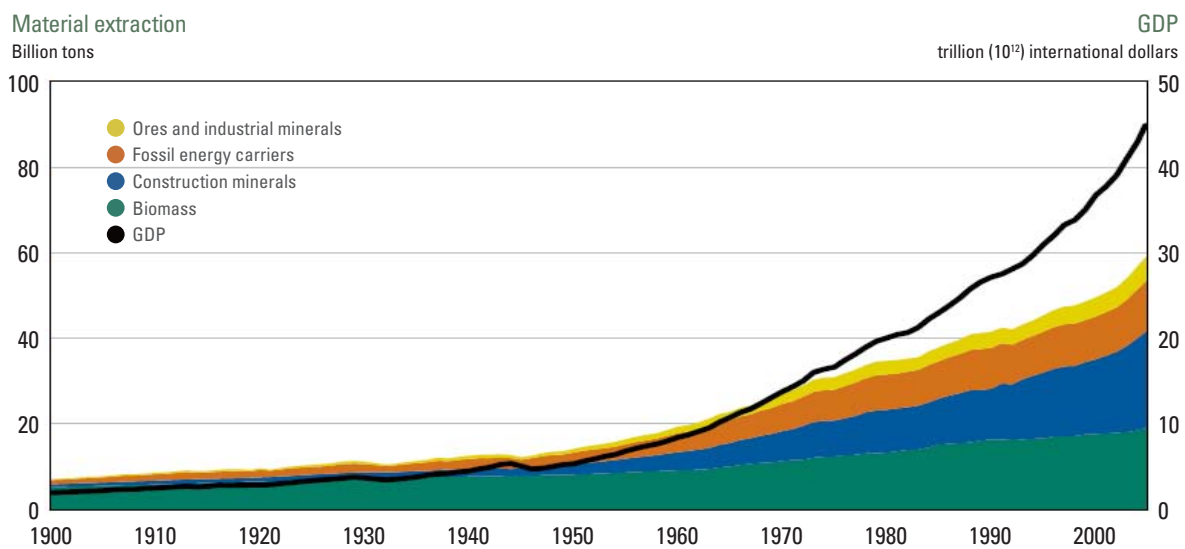


Introduction

Background

The current production and consumption patterns cannot be sustained for the balanced advancement of economic prosperity, environmental sustainability and social inclusiveness. The economic growth has come at the expense of environmental degradation and natural resource depletion. The annual costs of environmental degradation range from 2.1 percent to 7.4 percent of national gross domestic product across different regions.¹ More than 60 percent of the ecosystem is currently overexploited², and the extraction of raw materials such as biomass, construction minerals, fossil fuels, and ores and industrial minerals has reached at the rate of 59 billion metric tons per year in 2005(see Figure 1).

Figure 1. Global material extraction in billion tons from 1900 to 2005



Source: Krausmann, et al., M. "Growth in global materials use, GDP and population during the 20th century". *Ecological Economics*, 68/10(2009): 2696-2705. Derived from UNEP, *Decoupling natural resource use and environmental impacts from economic growth*. A Report of the Working Group on Decoupling to the International Resource Panel(Paris, UNEP, 2011)

It is imperative to change our production and consumption patterns in a more sustainable way, which requires timely and concerted efforts. The change of production and consumption patterns among the rising middle classes, estimated to reach 4.9 billion by 2030³, will add further pressure to resources and environmental challenges. If the current

1. Lelia Croitoru, *The Cost of Environmental Degradation: Case Studies from the Middle East and North Africa* (Washington, D.C., World Bank, 2010)
 2. Millennium Ecosystem Assessment. *Ecosystems and Human Well-being: Synthesis*. (Washington, DC, Island Press, 2005)
 3. Estimate from OECD, Accessed Nov 11, 2013. http://www.oecdobserver.org/news/fullstory.php/aid/3681/An_emerging_middle_class.html

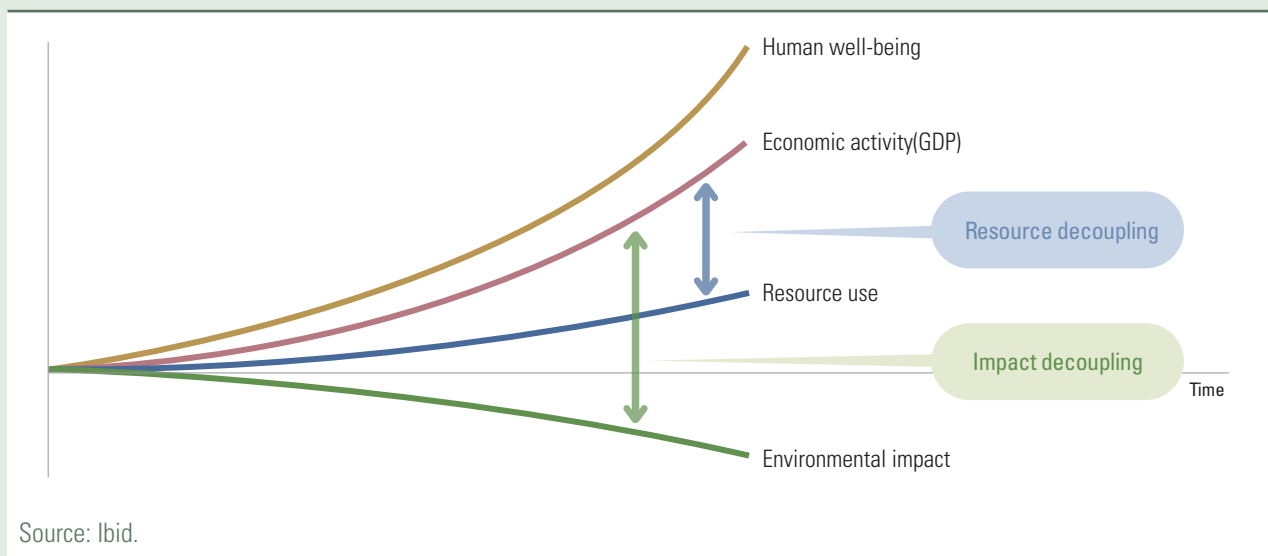
consumption rate of developed countries is to continue, 140 billion tons of global natural resources are to be extracted per year by 2050,⁴ and mankind will require three Earth-like planets for self-sustenance by 2050.⁵

Without proper management of production and consumption patterns, the developmental gains achieved from economic growth will be eventually threatened by environmental and social costs from adverse effects such as climate change, loss of biodiversity and rising resource prices.

Aiming to decouple economic growth from excessive uses of resources and environmental degradation, sustainable consumption and production (SCP) is commonly defined as "the use of services and related products, which respond to basic needs and bring a better quality of life while minimizing the use of natural resources and toxic materials as well as the emissions of waste and pollutants over the lifecycle of the service or product so as not to jeopardize the needs of further generations."⁶

In short, SCP can be understood as doing more and better with less and can be materialized by improving eco-efficiency in production and consumption patterns(see Figure 2).

Figure 2. Concept of decoupling



Since the early 1990s, sustainable consumption and production has emerged as a global policy agenda for the realization of sustainable development. At the 1992 United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro, Brazil, unsustainable patterns of consumption and production were pointed out as the major cause of global environmental degradation. In accordance with the Johannesburg Plan of Implementation (JPol) adopted at the World Summit on Sustainable Development (WSSD) in 2002, the subsequent Marrakech Process initiated the development of a 10-year framework of programmes on sustainable consumption and production (10YFP).

4. UNEP, *Decoupling natural resource use and environmental impacts from economic growth*. A Report of the Working Group on Decoupling to the International Resource Panel(Paris, UNEP, 2011)

5. Estimate from Global Footprint Network, Accessed Nov 11, 2013. http://www.footprintnetwork.org/en/index.php/GFN/page/world_footprint/

6. Norwegian Ministry of Environment, Oslo Symposium on Sustainable Consumption, 1994



Building on the outcomes of the Marrakech Process, UN member countries adopted the 10 YFP at the Rio+20 Conference in 2012 as “a global framework of action to enhance international cooperation to accelerate the shift towards SCP in both developed and developing countries”. The 10YFP encompasses six focus areas including Sustainable Public Procurement, Consumer Information, Sustainable Lifestyle and Education, Sustainable Tourism, Sustainable Building and Construction, and Sustainable Food System. Sustainable consumption and production is also highlighted in the Sustainable Development Goals (SDGs), which will lay out the future direction of the sustainable development agenda worldwide.

Trends in raw material extraction and resource use patterns of Korea

The Republic of Korea has achieved rapid economic growth and industrialization throughout the late 20th century. However, economic growth in Korea has been coupled with the high consumption of resources, which subsequently placed pressure on the economy resulting from rising resource prices as well as external costs of environmental degradation. Domestic material consumption (DMC)⁷ per capita has rapidly increased by about four percent per year from 1970 to 2008, and Korea’s DMC in 2008 is more than 1.5 times the global average (see Figure 3). Water consumption increased six times over 30 years from 1965 to 1995 (see Figure 4), mainly driven by the demands on agricultural purposes. The supply of primary energy rises by about six times from 45 million toe in 1981 to 278 million toe in 2012 (see Figure 5).

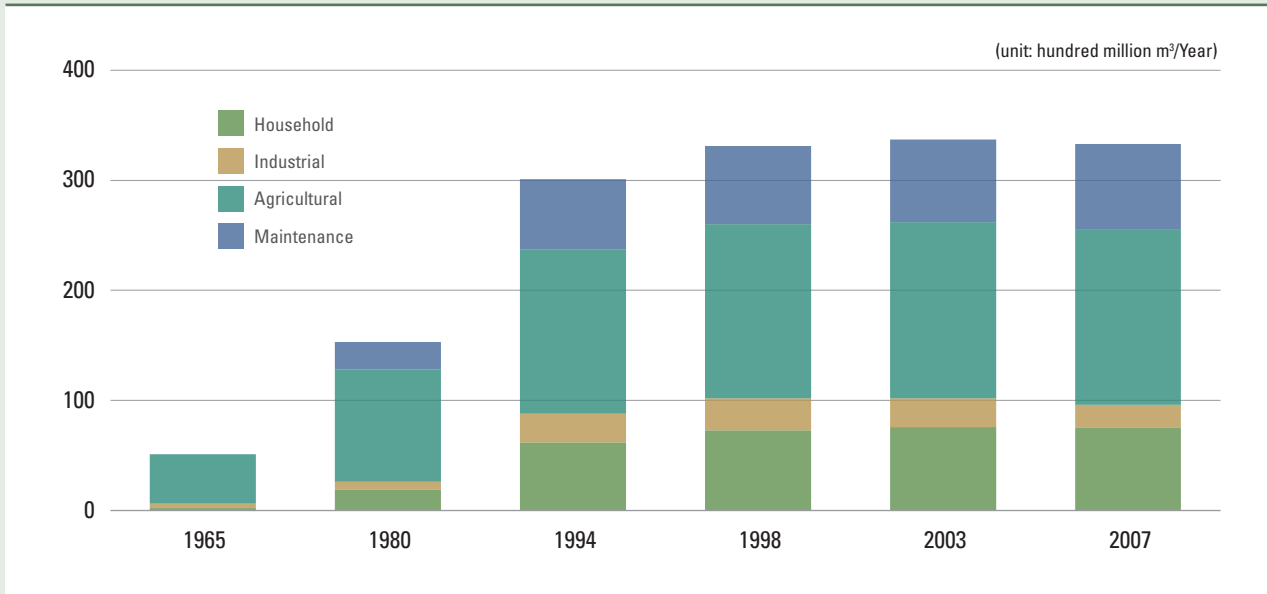
Figure 3. Trends in domestic material consumption (DMC) of Korea



Source: UNEP, *Recent trends in material flows and resource productivity in Asia and the Pacific* (Bangkok, UNEP, 2013)

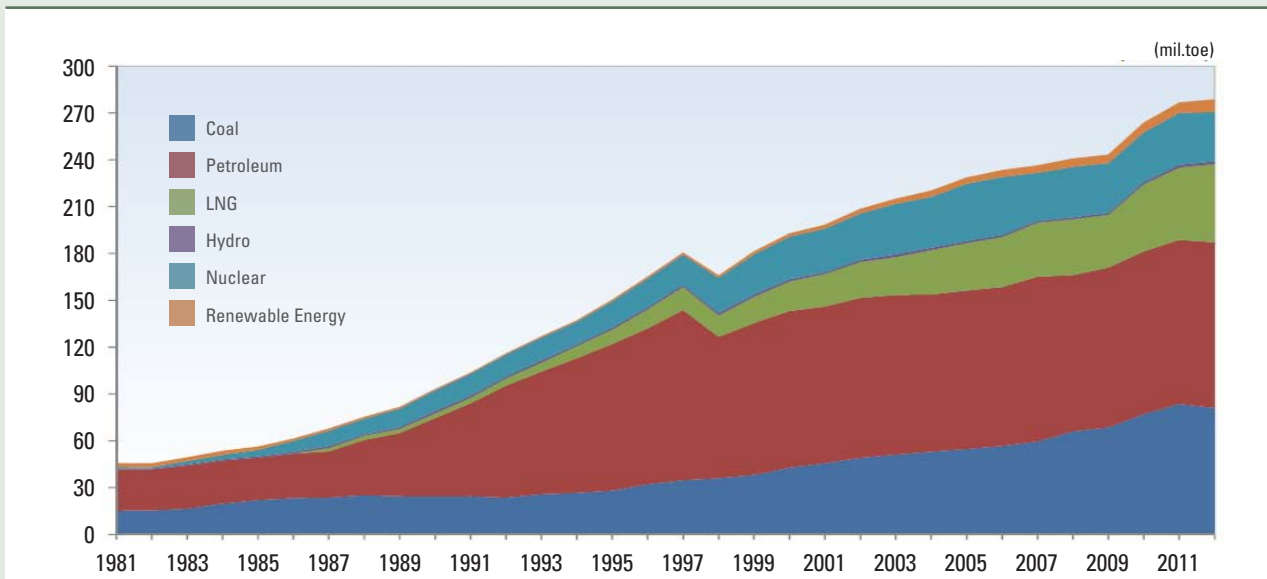
7. biomass, construction minerals, fossil fuels, and ores and industrial minerals

Figure 4. Trends in water consumption by purposes



Source: Ministry of Land, Infrastructure and Transport

Figure 5. Trends in primary energy supply by sources

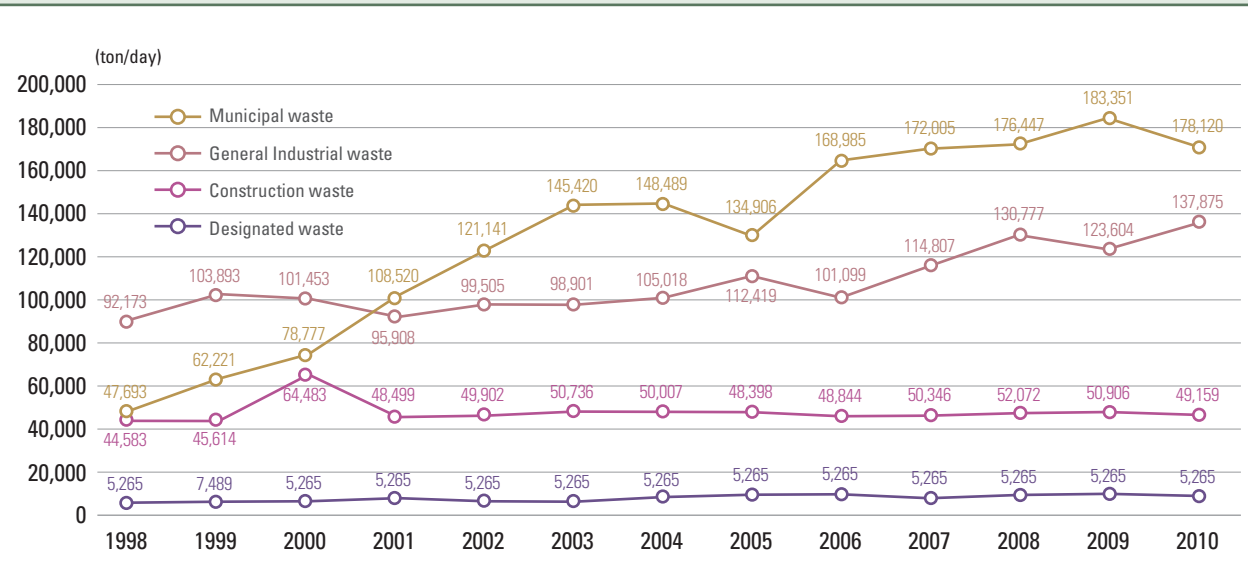


Source: Ministry of Trade, Industry & Energy, *Yearbook of Energy Statistics 2013* (Korea Energy Economics Institute, 2013)

As the level of income in Korea drastically rose by almost by 90 times from 291 USD in 1970 to 25,976 USD in 2013, consumption patterns and lifestyles became modernized and becoming more resource intensive. While people enjoy a relatively high level of affluence, the quality of life among the public deteriorated due to air pollution, water contamination, and waste generation accompanied by resource intensive production and consumption patterns. Total waste generation is gradually growing, and about 10 percent of the entire lands in Korea is being used as landfills (see Figure 6).



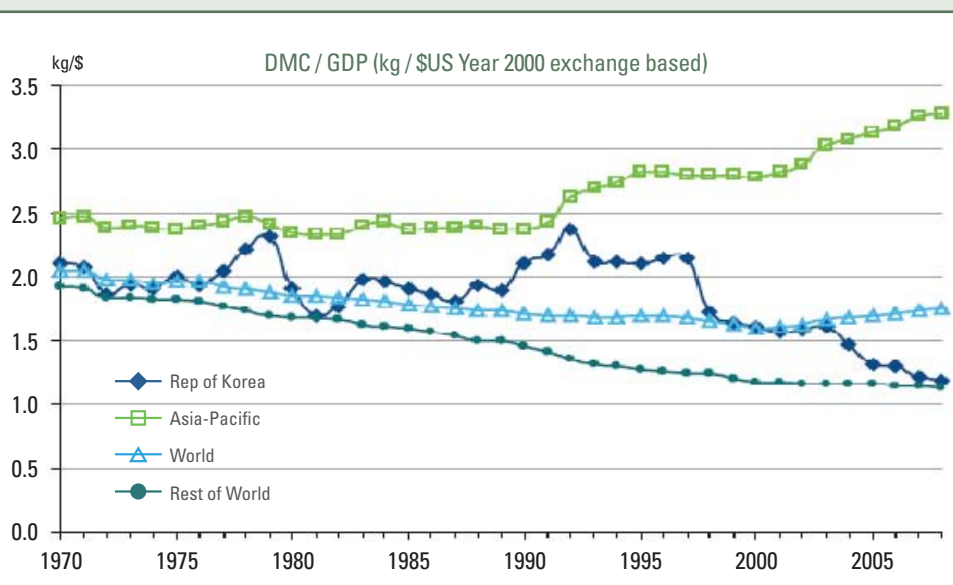
Figure 6. Trends in waste generation



Source: Ministry of Environment, *Environmental Review 2013* (Ministry of Environment, 2013)

In order to address these challenges, the Korean government has shifted the paradigm of national development towards sustainable development since the early 1990s. As a result, the material intensity (DMC/GDP) has been improving since early 2000s (see Figure 7). Water consumption per capita reached a peak of 409 liter per year in 1997, and has since continued to decline afterwards. The recycling rate of waste grew 2.5 times from 23.7 percent in 1995 to 60.5 percent in 2010.

Figure 7. Trends in material intensity



Source: UNEP, *Recent trends in material flows and resource productivity in Asia and the Pacific* (Bangkok, UNEP, 2013)

On the other hand, issues such as sustainable management of chemical substances and the treatment of electrical and electronic waste are emerging as new challenges to be dealt with in the future. At present, more than 40,000 kinds of chemical substances are in domestic circulation, and 300 new chemicals are set to enter the Korean market. Furthermore, more than 600,000 tons of electrical and electronic wastes are being produced per year.⁸

Drivers and challenges of sustainable consumption and production in Korea

Sustainable consumption and production requires a balanced approach of both technological push and market-based pull policies. In other words, it is crucial to create a virtuous cycle of investment in green R&D, which in turn supports eco-innovation and sustainable production, distribution of sustainable products and services, and increases in consumer demands on sustainable products. The Korean government has adopted a push-and-pull SCP strategy to achieve sustainable development.

Sustainable consumption and production in Korea has been pursued with particular focus on the creation of new markets for green products and services. The investments in environmental R&D and eco-innovation of products have been, to some extent, driven to respond to the product-based environmental regulations and standards led by industrialized countries. In many cases, EU-led environmental directives such as the Restriction of Hazardous Substances (RoHS) and Waste Electrical and Electronic Equipment (WEEE) serve as key environmental standards for Korean enterprises to follow in order to enter the European market. The adoption of sustainable production practices is considered as a strategy for enterprises to increase their competitiveness in the international market.

The emergence of green-conscious consumers is another influential factor on the change of consumption and production patterns. There have been growing concerns among consumers on the environmental performance of products as well as the potential impacts on human health. This trend has been in line with consumer movements and activities initiated in the 1990s, while the Korean mass media has played a key role in raising public awareness on various environmental issues such as sick building syndrome and toxic chemical accidents.

However, a number of barriers continue to hinder the uptake of green products in the market. The KEITI undertook a study in 2010 in order to identify major obstacles that prevent the purchase of green products, the results of which demonstrated that about 34 percent of Korean consumers find it difficult to identify green products in the market, while 16 percent of the public believe that the number of green products is insufficient to cater to consumer demands. Around 10 percent of the public assume that green products are too expensive. A proportion of respondents indicated a willingness to purchase green products, but claimed to have very little knowledge of routes to acquire such products.

8. Ministry of Environment, *Environmental Review 2013* (Ministry of Environment, 2013)



SCP policies in Korea have been introduced in order to support enterprises to adopt more sustainable and resource-efficient production practices as well as to tackle obstacles against sustainable consumption such as those identified above. The experiences of Korea in pursuing SCP illustrates that, with the proper policy framework in place, SCP can serve as a driver to sustain economic growth, while improving the quality of life and minimizing environmental externalities.

Legal and policy framework for SCP

The legal framework for SCP in Korea consists of two pillars, consisting of the Environmental Technology and Industry Support Act and the Act on Promotion of Purchase of Green Products. The Support for Environmental Technology and Industry Act (formerly, the Development of and Support for Environmental Technology Act, 1994) provides the legal ground for the provision of support for the research and development of environmental technologies and the environmental industry. Under the aforementioned act, the KEITI has operated and managed the national environmental R&D program, provided technical and financial assistance to environmental enterprises, and operated the eco-labeling scheme.

The implementation of SCP policies assumed a more concrete form when the Act on Promotion of Purchase of Green Products was legislated by the Ministry of Environment in 2005. The said Act aims to nurture the green products market by stimulating the demand on green products as well as facilitating the easy access of consumers to green products. The act serves as the basis for the implementation of green public procurement, voluntary agreement on green business procurement, and green store certification, etc.

The Ministry of Environment is mandated by the Act on Promotion of Purchase of Green Products of 2005 to establish the Action Plan for the Promotion of Purchase of Green Products every five years. The Action Plan is formulated in consultation with the relevant public organizations in order to set medium-term goals and strategies for the promotion of green products. The progress made over the preceding five years are reviewed in the plan using key indicators including the number of green product categories, number of green stores, number of green consumption collaborating centers, and market volume of green products.

The 1st Action Plan (2006-2010) established the comprehensive framework to implement green procurement in the public sector, in connection with eco-labeling. Building on the successful outcomes of the first phase (2006-2010), the strategic focus of the 2nd Action Plan (2011-2015) was to raise awareness on sustainable lifestyles and boost green consumption among general consumers. As a result, the green credit card and green store certification schemes were newly introduced in 2011. Currently, 12 action plans are identified in four focus areas under the 2nd Action Plan (2011-2015) as described in the below table.

Table 1. Overview of the 2nd Action Plan for Promotion of Purchase of Green Products

Focus areas	Strategic goals	Major policies and activities
Green consumption and sustainable lifestyle	<ul style="list-style-type: none"> • Expand incentives for green consumption • Establish and operate green consumption centers in each region • Raise awareness on green consumption and sustainable lifestyle • Establish an integrated green product information platform 	<ul style="list-style-type: none"> • Green Credit Card • Green Product Information platform • Green Consumption Collaborating Center • Green Consumption Week • ECO EXPO KOREA • Eco-Business Award • Eco-labeling • Green building certification
Production and distribution of green products	<ul style="list-style-type: none"> • Support the development of green products • Expand nationwide distribution network for green products • Support and facilitate production, distribution and purchase of green products 	<ul style="list-style-type: none"> • Eco-design • Green-up • Green Store Certification • Eco-labeling • Green building certification
Green Public Procurement (GPP)	<ul style="list-style-type: none"> • Improve policy framework for GPP • Expand the enabling environment for GPP • Facilitate the distribution of green construction materials in connection with GPP 	<ul style="list-style-type: none"> • Green Public Procurement • Eco-labeling
International Cooperation	<ul style="list-style-type: none"> • Strengthen international cooperate on the Korea Eco-labeling and Carbon Footprint labeling • Enhance international cooperation on green consumption and production • Respond to international environmental regulations on products. 	<ul style="list-style-type: none"> • Board membership of the 10 YFP on SCP • Co-leadership of the 10YFP SPP programme • MRA with 11 eco-labeling program • Secretariat of the ACFN

Consumer Information

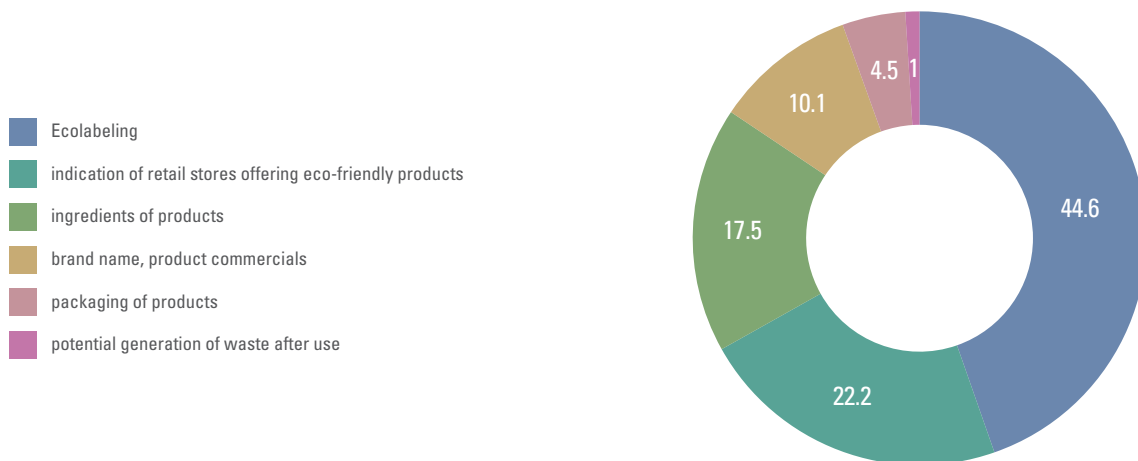
Eco-labeling is the most effective tool to help consumers to identify eco-friendly products, followed by the indication of retail stores that offer eco-friendly products, the indication of ingredients of the products, and the brand name value (see Figure 8).

There are a number of social and eco-labeling, ratings and standards for products and services including fair trade products, social enterprise certification products, energy efficient labeled products, eco-friendly agricultural certified products, etc. Given the existence of a variety of social and eco-label programs as well as self-declarations on those products, consumers are often faced with difficulties of product choice and determining the extent of credibility for diverse labeling systems as to their environmental and social claims.



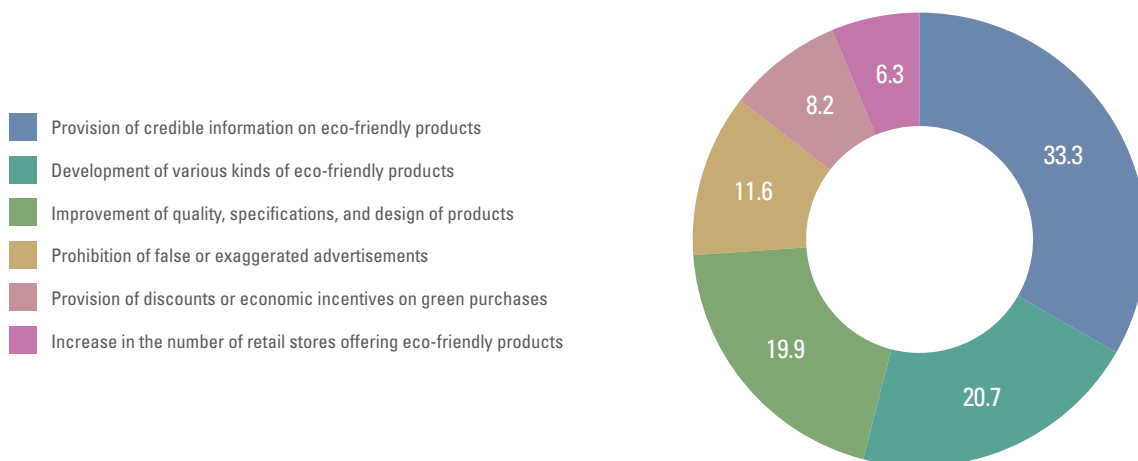
Therefore, the provision of reliable and credible information on eco-friendly products is regarded as the most important factor in raising the market share of eco-friendly products, followed by the development of various kinds of products, as well as the improvement of quality, specifications, and design of products (see Figure 9). As in the case in many industrialized countries, there are growing needs for market intervention to prevent the problem of so-called green washing.

Figure 8. Method to identify eco-friendly products? (%)



Source: KEITI, *Public awareness survey on eco-labeling* (KEITI, 2014)

Figure 9. Method to increase the market share of eco-friendly products? (%)



Source: Ibid.

Policy instruments that provide information on the environmental performance and eco-friendliness of products and services include Korea Eco-labeling, Carbon Footprint Labeling, Green Building Certification, and Green Store Certification. These policy instruments aim to assist consumers to make an informed decision on greener options.

The promotion of SCP in Korea can be traced back to the early 1990s when **the Korea eco-labeling** was first introduced in order to provide credible information on green products for consumers. However, the purchase of green products remained anemic due to the limited number of eco-labeled products available and the lack of demand for those products. When the Korea eco-labeling was launched in 1992, only 82 products under four categories were awarded the label.

The Korea eco-labeling scheme benefited from the adoption of the Act on Promotion of Purchase of Green Products in 2005, under which green public procurement is implemented in connection with the Korea eco-labeling. The integrated approach of green public procurement and eco-labeling was instrumental in stimulating the green products market by leveraging public demand on eco-labeled products. The number of products certified by the Korea eco-label has increased 3.8 times by 2012 compared to 2004.

Carbon footprint labeling was introduced in 2009 in order to address climate change. Carbon footprint labeling aims to sensitize consumers to GHG emissions generated for the use of products and services, thereby encouraging consumers to choose low carbon products. Carbon footprint labeling, especially low carbon certification, is implemented to contribute to meeting the national GHG emission reduction target. The number of carbon footprint labeled products has reached around 1,200, thereby ranking the Republic of Korea at second place in the world with regards to the number of certified products.

Green Store Certification has been introduced to encourage the environmental management of retail stores and assist the distribution of green products, thereby improving their accessibility for customers. There are 201 stores certified as green stores as of 2013, including department stores, large supermarkets, and electronics appliances and organic product stores. Operating in conjunction with the green credit card scheme, green store certification plays a key role in expanding the green product market for consumers.

The Green Standard of Energy and Environmental Design (G-SEED) is a form of eco-labeling applied to buildings and initiated in partnership between Ministry of Land, Infrastructure and Transport and Ministry of Environment. The G-SEED rates the environmental performance of buildings throughout the lifecycle from design, construction, maintenance and management to demolition. It takes into account various environmental factors including energy and resource conservation, reduction of pollutant emissions, level of comfort, and harmony with surroundings. As of December 2013, the total number of certifications reached at 3,923, including 2,551 provisional certifications and 1,372 main certifications.

G-SEED not only contributes to ecologically enhancing the construction sector but also facilitates the distribution of green products through the use of eco-friendly building materials. Construction materials account for more than 45 percent of 150 eco-label certified products. Furthermore, in accordance with the 2010 Guidelines for Efficient Energy Usage in Public Institutions, public buildings with a total floor area greater than 10,000 square meters are obligated to obtain the green building certification. Therefore, the market for green construction materials and the demand for G-SEED are expected to grow further.

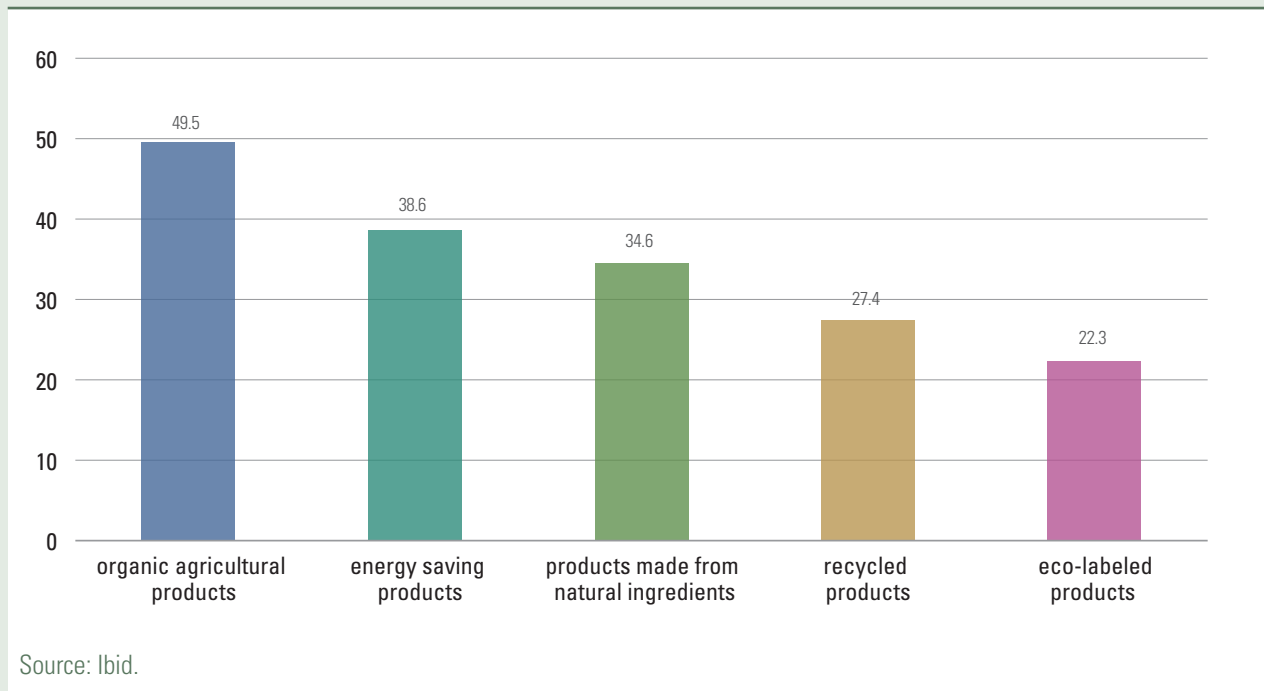


Sustainable Consumption and Lifestyle

Following the increase in income levels and the growth of public interest in environmental health and safety issues, eco-friendly and/or socially responsible products are accordingly gaining greater public favor. According to the 2014 public awareness survey on eco-labeling, 75.2 percent of people consider the environmental performance of products when making a purchase, and 76.1 percent of respondents have had some experience of purchasing eco-friendly products.⁹

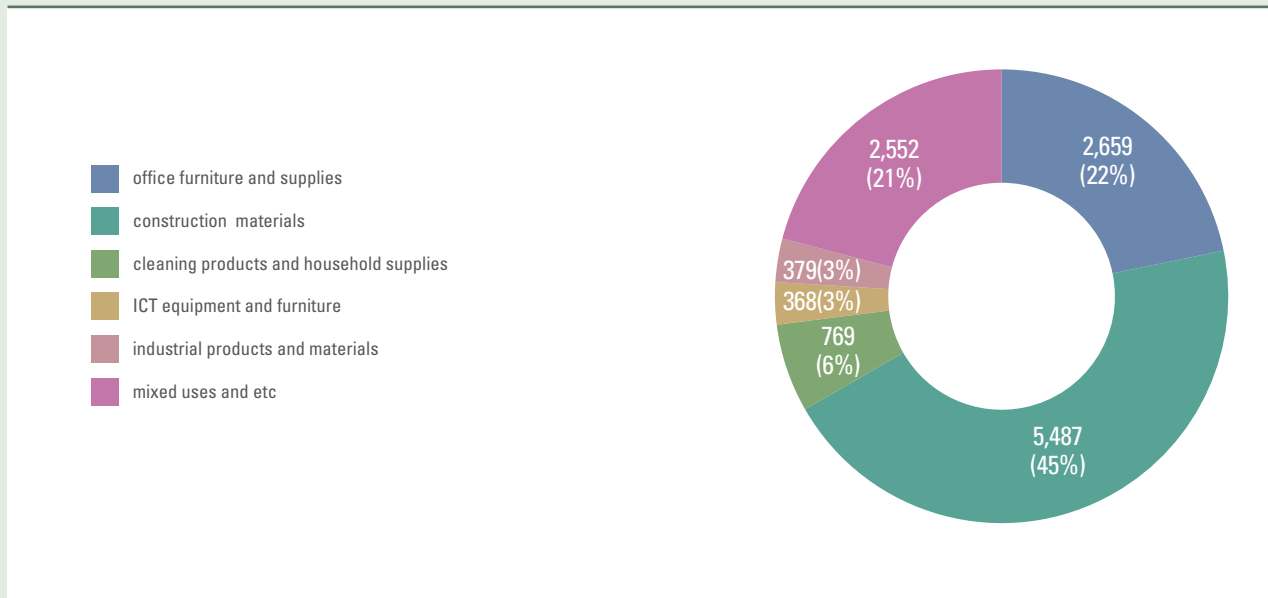
The survey responses revealed the most frequently purchased products to be organic agricultural products (49.5%), followed by energy saving products (38.6%), products made from natural ingredients including cosmetics and clothes (34.6%), recycled products (27.4%), and eco-labeled products (22.3%) (see Figure 10). Consumers indicated the desire for greater variety in the types of eco-friendly products in personal hygiene products (30.4%), food products (28.4%), and the other consumer goods (20.2%).

Figure 10. Types of eco-friendly products purchased (%)



Among the eco-labeled products, the market size for Korea eco-labeled products has increased by approximately 22 times from 1.5 trillion KRW (1.5 billion USD) in 2001 to 34 trillion KRW (34 billion USD) in 2013. Construction materials account for the largest share of the certified products, followed by office equipment and furniture (see Figure 11).

9. KEITI, Public awareness survey on eco-labeling (KEITI, 2014)

Figure 11. Number of Korea eco-labeled products by category

The movement to promote the purchase of green products in Korea has largely been led by the public sector. **Green public procurement** was initiated in accordance with the Act on Promotion of Purchase of Green Products in 2005 and implemented in tandem with the Korea Eco-label. Government agencies under the central and local governments and public organizations are obliged by the Act to submit an annual action plan on green purchases and performance records of the previous year to the Ministry of Environment at the beginning of each year.

Green public procurement played a key role in leveraging public demand on green products and services at the early stage of green market development. The total volume of green procurement by all public institutions reached around 2 billion USD in 2013, which has grown 2.6 times since 2005.

In the private sector, the Ministry of Environment and private enterprises have entered into **voluntary agreements on business green procurement** since 2005 in order to facilitate the voluntary production, distribution and purchase of green products by companies. At present, 151 companies are engaged in the initiative. In addition, a variety of private partnership programs are carried out to facilitate green consumption in the private sector.

Furthermore, price was shown to be significant when consumers purchase eco-friendly products. About 22 percent of respondents of the survey indicated their reluctance to purchase eco-friendly products whose price is higher than conventional counterparts, while the rest of the respondents indicated that prices higher than the market average by a maximum of 10 percent may be tolerable with regards to eco-friendly products.

The Green Credit Card is an incentive system jointly launched by the government and credit card companies to provide economic incentives with green-conscious consumers. Economic incentives are provided for i) purchasing low-carbon and eco-friendly products, ii) using public transport; and iii) saving utility rates including electricity, water, and gas. The credit card platform serves as a convenient medium to accumulate and use eco-money points in daily life, thereby attracting more than 9 million users.



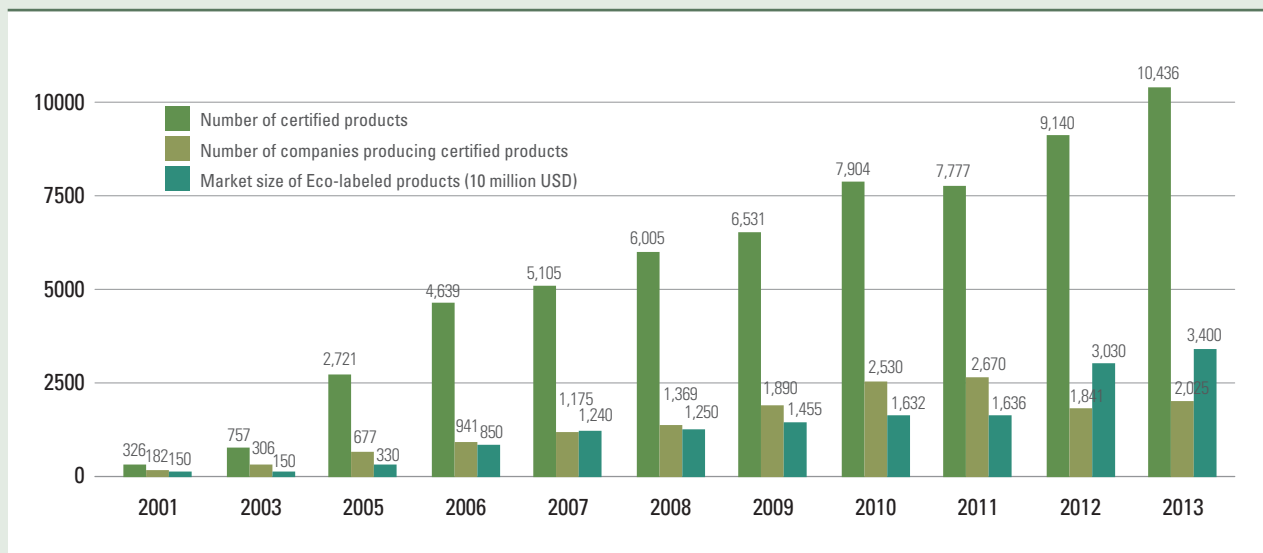
Concurrently, efforts are being made to help general consumers to better understand the concept of green living and to promote green products by raising public awareness. At present, four **Green Consumption Collaborating Centers** have been established, offering consumer education on green consumption.

ECO-EXPO Korea is the biggest environmental exhibition in Korea, featuring various eco-friendly technologies, products, services and other environmental activities of businesses and the government. The exhibition has been held since 2005 and serves as a platform to raise public awareness on eco-friendly consumption and lifestyles. Drawing the participation of 216 companies and more than 40,000 visitors, the 2014 exhibition was composed of theme halls including eco-friendly products and services, eco-friendly distribution and retail, eco-friendly technology, eco-fashion, green buildings, and green transport.

Sustainable Business

In Korea, the concept of sustainability has been incorporated in business strategies since the early 1990s in order to address global and domestic environmental issues. The strategic focus has shifted from the development of pollution treatment technologies to precautionary and systemic approaches in the 2000s aiming to improve resource efficiency over the entire production process. The concept of corporate social responsibility has been embraced by major sectors, and a variety of eco-friendly products and services are being developed by more than 2000 enterprises

Figure 12. Trends in Eco-friendly products market in Korea



Given that small and medium enterprises (SMEs) possess limited human resources and technical capacities to adopt sustainable strategies, the government provides financial and technical assistance to SMEs such as the Eco-Business Award, GREEN-UP, and Eco-design program.

The eco-design program and Environment Management Consulting for SMEs (Green-up) programs aim to improve the capacity for environment management and eco-friendly production among small and medium-sized enterprises.

Green-up, Environment Management Consulting for SMEs, is a business assistance program that provides environmental management consultations with SMEs to improve their market competitiveness, resource conservation, and environmental performance. It aims to provide environment consulting customized for SMEs across different sectors in order to address major environmental issues, and publish standard environmental management manuals or guidelines for individual sectors.

The eco-design program is to encourage SMEs in developing and commercializing innovative products and services that address critical environmental problems. Financial and technical support is offered including the development of product prototypes, acquisition of patents and eco-label, and marketing.

Hosted by the Ministry of Environment and operated by Korea Environmental Industry & Technology Institute and Korea Economic Daily, **the Korea Eco-Business Award** serves as a reputational incentive to reward organizations or individuals that contributed to the development of eco-technology and industry; the mitigation of climate change; and eco-friendly consumption and production. It encouraged share their successful eco-friendly practices and disclose related sites if requested by relevant institutions.

Table 2. History of SCP policies in Korea

1992	<ul style="list-style-type: none"> • Implemented Korea Eco-labeling
1994	<ul style="list-style-type: none"> • Established Development of and Support for Environmental Technology Act
2002	<ul style="list-style-type: none"> • Implemented green building certification(G-SEED) • Introduced Eco-design Program
2005	<ul style="list-style-type: none"> • Enforced Act on Promotion of Purchase of Green Products • Implemented Green Public Procurement in accordance with the above Act • Concluded first voluntary agreement for business green procurement • Held first ECO EXPO Korea (eco-products exhibition)
2006	<ul style="list-style-type: none"> • Announced 1st Action Plan for Promotion of Purchase of Green Products (2006-2010)
2009	<ul style="list-style-type: none"> • Implemented Carbon footprint Labeling • Launched first Green Consumption Week • Introduced Eco-Business Award
2011	<ul style="list-style-type: none"> • Announced 2nd Action Plan for Promotion of Purchase of Green Products (2011-2015) • Implemented Green Store Certification • Introduced Green Credit Card
2013	<ul style="list-style-type: none"> • Established Green Consumption Collaborating Centers



International Cooperation

Republic of Korea is dedicated to contributing to global sustainability by exchanging knowledge and sharing the experiences in the implementation of various policies including ecolabeling, green public procurement, green credit card, etc. In September 2013, KEITI joined the Board of the 10 year framework programme (10YFP), which was established to provide guidance on and support for the development and implementation of 10YFP.

Building on the expertise gained in the area of green procurement, KEITI collaborates with UNEP and ICLEI in leading the 10YFP Sustainable Public Procurement Programme, which is one of the six focus areas under the 10YFP. The Sustainable Public Procurement Programme aims to build the case for SPP and support the implementation of SPP in practice.

At the regional level, KEITI has provided technical and financial support in operating the ASEAN+3 Green Public Procurement and Eco-labeling Network, which was officially established in October 2013 in Seoul. The network aims to strengthen SPP and eco-labeling in the ASEAN region, based on the expertise of China, Japan and South Korea in the combined use of SPP and eco-labeling.

In addition, KEITI serves as the secretariat for the Asia Carbon Footprint Network (ACFN) with UNESCAP in order to transfer knowledge and enhance cooperation for carbon footprint labeling amongst Asian countries including China, Thailand, and the Philippines.



Part 1

Consumer information

Policy Handbook for
Sustainable Consumption and
Production of Korea

Korea Eco-labeling

The Korea Eco-label is marked on products to indicate relatively low emission levels of environmental pollutants or greater conservation of resources throughout the product's life cycle in comparison with those of the same usage



The Korea Eco-labeling aims to

- Encourage consumers to make an informed decision and develop eco-friendly consumption pattern;
- Increase marketability of eco-friendly products and encourage manufacturers to develop eco-friendly products;
- Minimize adverse environmental impacts arising from production and consumption of goods or services;
- Contribute to green growth by developing the criteria for eco-labeling and certifying eco-labels for domestic green products.

Legal Basis

- Article 17 (Certification of Korea Eco-label) and 25 (Fees, etc.) of the Support for Environmental Technology and Environmental Industry Act

Major Milestones

- April 1992: Introduced Korea Eco-label Program (MoE Notification No. 1992-22).
- June 1994: Established Korea Eco-Label Association as the agency responsible for the Korea Eco-Labeling.
- June 1995: Established legal basis for the operation of Eco-Labeling (Development of and Support for Environmental Technology Act, which was amended and replaced by the Support for Environmental Technology and Environmental Industry Act in 2011)
- October 1997: Joined the Global Ecolabelling Network (GEN).
- July 2005: Enforced the Act on Promotion of Purchase of Green Products
- October 2013: Revised Korea Eco-labeling fees (MoE Notification No.2013-128).
- As of August 2014: Concluded Mutual Recognition Agreements (MRAs) with 11 overseas eco-labeling agencies.

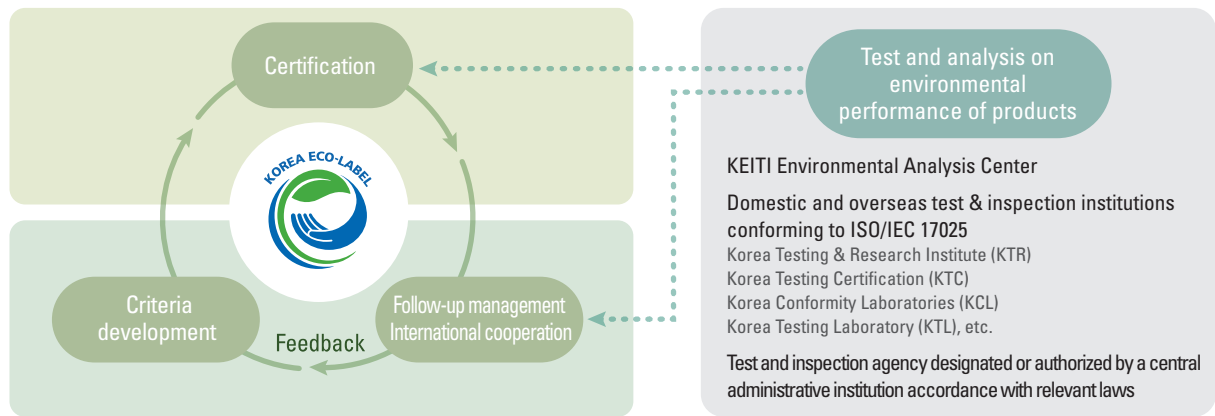
HOW IT WORKS

Working Mechanism of the Korea Eco-label

The Ministry of Environment is responsible for the overall management of eco-labeling including the establishment and revision of relevant laws and regulations.

The Korea Environmental Industry and Technology Institute (KEITI) is responsible for the implementation of the eco-labeling including establishment and revision of criteria per product; certification of eco-label and follow-up management of eco-labeled products; and promotion of eco-labeling and certified products.

Figure 1. Institutional arrangement of the Korea Eco-labeling



Selection of Target Product Groups and Development of Criteria for Korea Eco-labeling

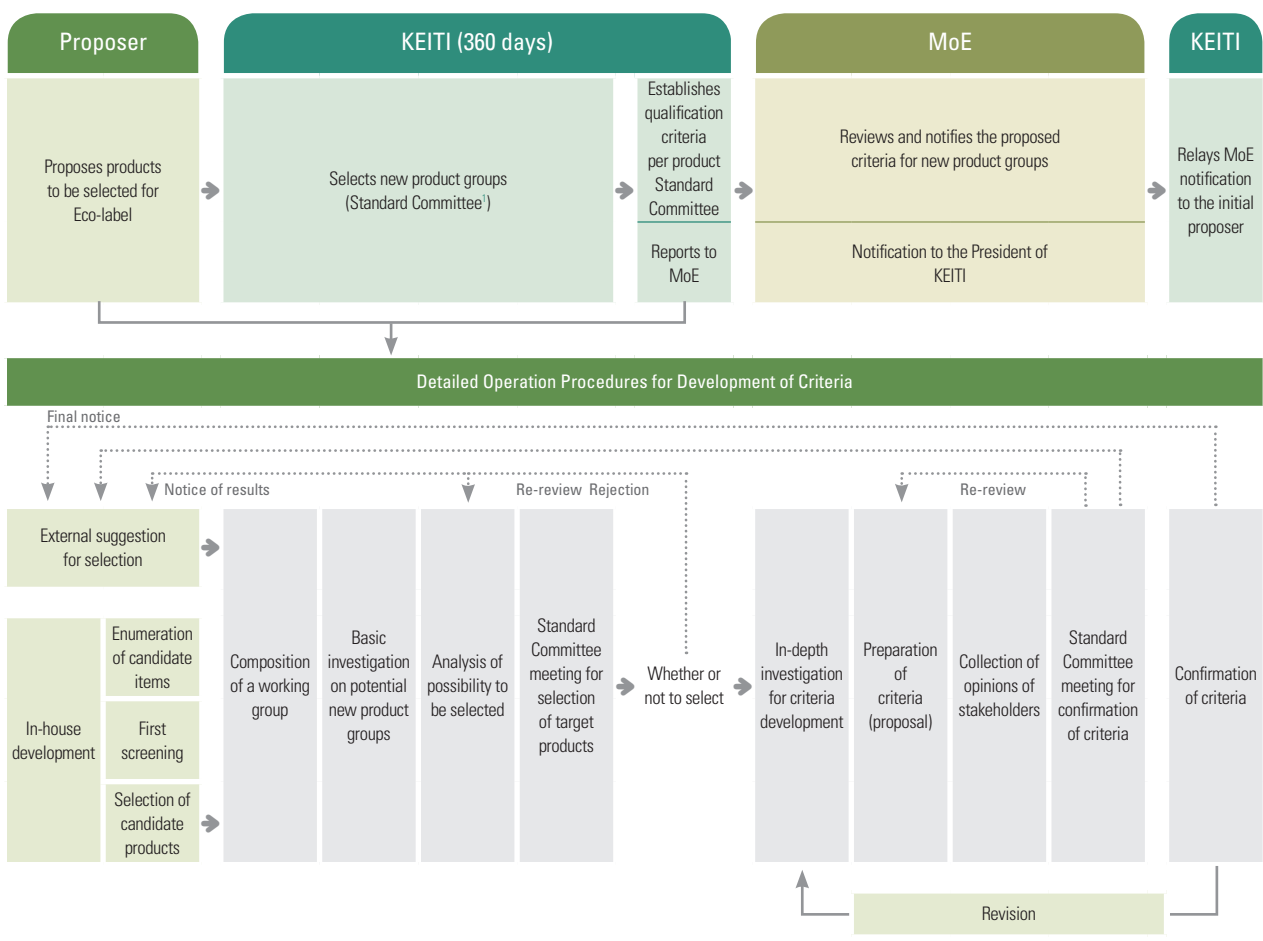
KEITI establishes criteria for target product groups subject to Korea Eco-label. Target product categories for the Eco-label are proposed through either an external suggestion or internal review, taking into account types and characteristics of the products as well as the relevant market size. Upon the submission of a proposal, a Standard Committee¹ is formed to deliberate and decide on the approval of the relevant new product group.

Table 1. Selection Criteria for Target Product Groups

	Selection criteria for target product groups
Conformity to the Existing Laws	<ul style="list-style-type: none"> • Whether the proposed product groups are subject to Article 24 of the Enforcement Decree of the Support for Environmental Technology and Environmental Industry Act • The following products are not eligible for eco-labeling: foodstuff subject to the Food Sanitation Act; drugs and quasi-drugs subject to the Pharmaceutical Affairs Act; agrochemicals subject to the Agrochemicals Control Act; and wooden products designated as forestry products under the Forest Resources Creation and Management Act

Quantitative Measurability	<ul style="list-style-type: none"> • Whether at least two environmental criteria can be developed for the product groups • Whether the criteria of the product groups are not limited by a certain technology • Whether the criteria of the product groups can be differentiated from existing ones. • Whether the environmental characteristics of the product groups can be quantitatively measurable • Whether standards can be developed with regards to quality-related elements
Potential Distortion of Environmental Information	<ul style="list-style-type: none"> • Whether there are any possible distortion of environmental information during distribution of products in market
Urgency in Environmental Improvement	<ul style="list-style-type: none"> • Extent of potential environmental pollutants and effect on environmental improvement
Needs of the Relevant Stakeholders	<ul style="list-style-type: none"> • Where there are needs from governments, manufacturers and concerned organizations to develop the new product groups

Figure 2. Selection process for target product group and development of criteria



1. Standard Committee is divided in two categories. One exist to select target products group, and the other exists to confirm detailed qualification criteria per products.

Table 2. Example of environmental performance study for selecting new product group (e.g. wood composite)

Analysis on potential environmental benefits of specific product groups from a lifecycle perspective

Phases of life cycle Environmental load		A Sourcing of raw materials and production	B Distribution	C Use/ consumption	D Disposal	E Recycling
Resources	a. Resource use	I				
	b. Energy use	√	√			
Global level	c. GHG emission					
	d. Emission of ozone-depleting substances	II				
Local level	e. Emission of air pollutants	√	√		√	
	f. Discharge of water pollutants	√				
	g. Solid waste generation	√		√		I
	h. Destruction of eco-system					
Other environmental load	i. Use and discharge of toxic substances	III			√	√
	j. Emission of indoor air pollutants			IV		
	k. Noise/vibration, etc.	√			√	
Remarks	√ : Environmental pollutants likely to incur some impact, but at a negligible level. I : Reduction in resource consumption and waste generation due to use of waste wood and waste synthetic resin. II : Emission of ozone-depleting substances from use of blowing agents. III : Discharge of toxic substances from use of additives (flame retardants, stabilizers, lubricants). IV : Emission of VOCs and formaldehyde when using products for indoor use.					

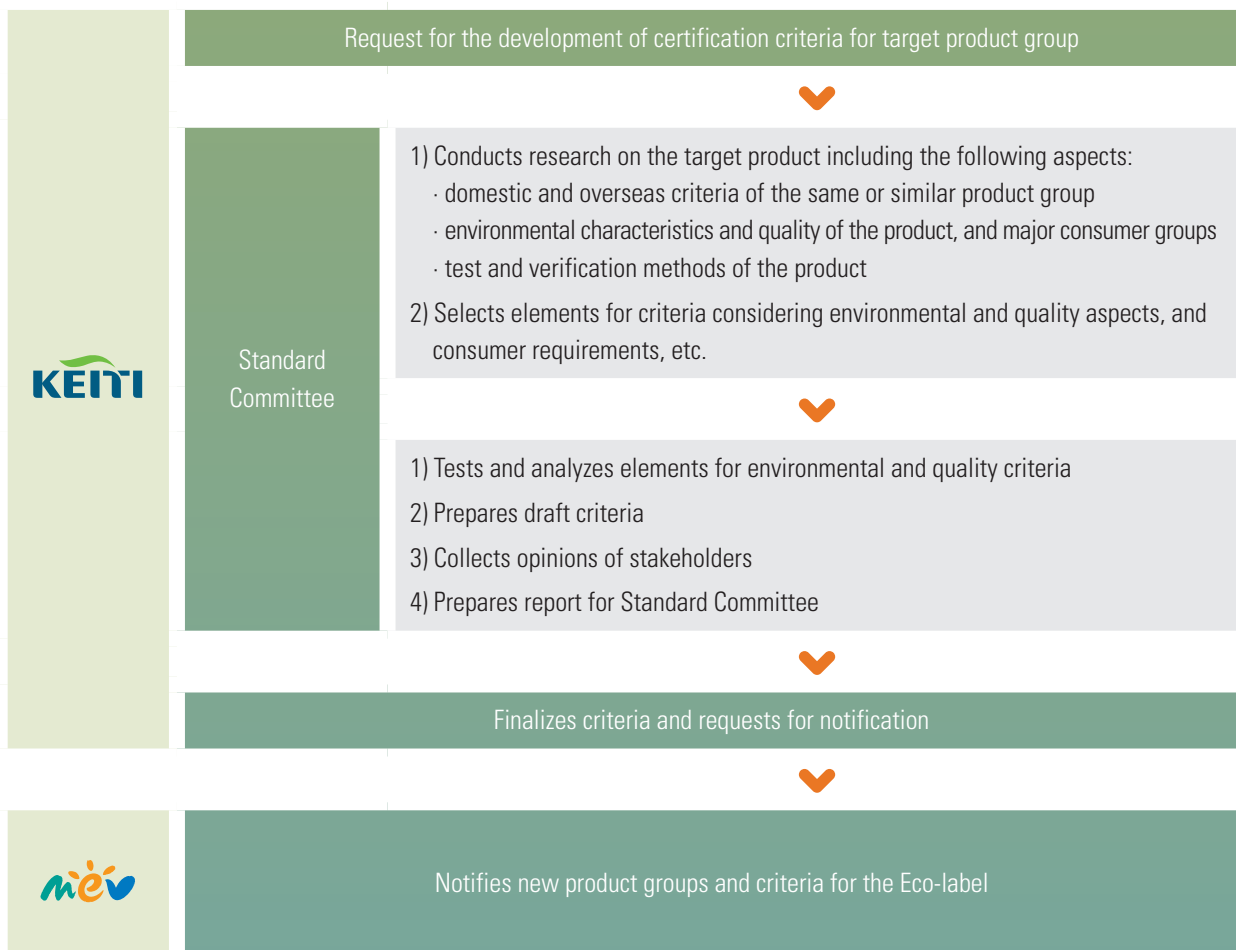
Examples of environmental assessment documents and relevant instructions

Load labels	Assessment elements	Selectivity ¹⁾	Quantitative measurability ²⁾	Accessibility ³⁾
I	Usage of thinning wood, waste wood and waste synthetic resins	High	High	High
II	Regulations on use of blowing agents	High	High	High
III	Regulations on use of heavy metals and toxic substances	High	High	High
IV	Emission of VOCs, and formaldehyde	High	High	High

- 1) Selectivity: Assesses whether the eco-friendly product can be differentiated from other products in the same product category.
- 2) Quantitative measurability: Assesses whether there are any domestic or overseas official standards such as the Korean Industrial Standard (KS), so that assessment elements can be repeatedly tested and quantitatively measured.
- 3) Accessibility: Assesses whether certification criteria have been developed to be open to all potential applicants. This aims to evaluate whether all applicants are capable of materializing technologies required to meet assessment elements.

Upon selection of the product groups via the standard committee, researchers develop Eco-label criteria and prepare a report on the draft certification criteria.

Figure 3. Procedures for Development of the Korea Eco-label Criteria



The criteria take into account both environmental performance and product quality. Environmental criteria are set to attain the top 20-30% of environment-related standards among products of the same category. It considers factors such as water and energy conservation, recycling, reduction of toxic substances emission, and biological safety. Each product is required to achieve quality equivalent to or higher than the Korean Industrial Standards (KS).

Table 3. The composition of Korea Eco-label criteria

Common criteria	Observance of environmental regulations and agreements	
	Observance of display method for consumer information	
	Observance of Act on Fair Labeling and Advertising	
Product-specific criteria	A. Scope of criteria	Establishment of applicable scope for criteria
	B. Definitions	Description of terminology to facilitate understanding of certification criteria
	D. Certification criteria	Environmental criteria
		Quality criteria
		Information to be notified to consumers
	E. Test method	Establishment of test and verification methods to verify fulfillment of each criteria
F. Grounds for certification	Disclosure of major environment load reduction as grounds for certification approval	

Upon outlining the draft criteria for the new product group, the Standard Committee is organized to review the draft criteria and collect comments from relevant stakeholders.

After incorporating opinions from relevant experts and stakeholders, a final version of the criteria is prepared and notified under the name of the Minister of Environment.

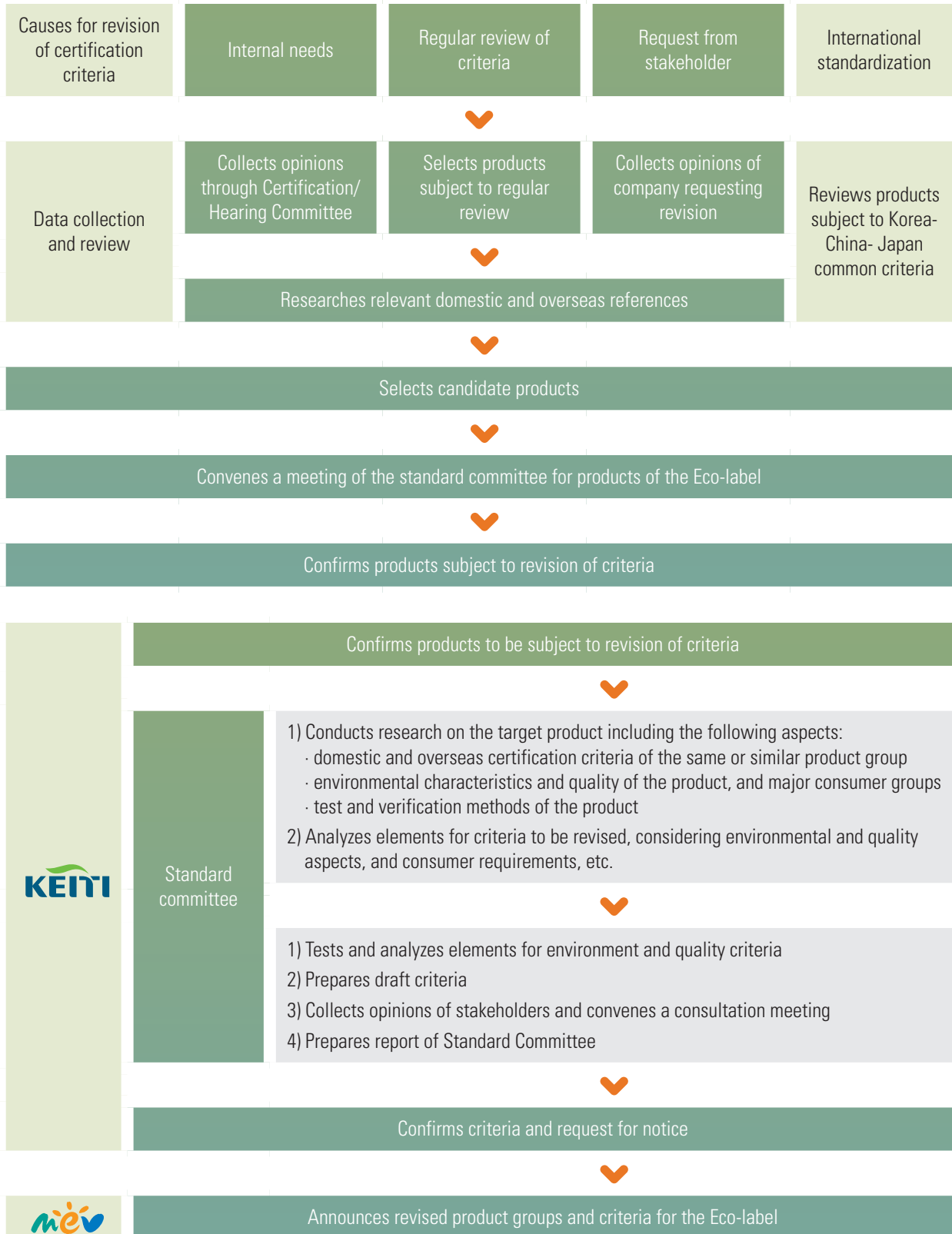
Revision of Korea Eco-label Criteria

The criteria are reviewed for revision in any of the following cases:

- (a) When any stakeholder submits a demand for revision of the criteria together with details of the reason for revision and proposal for revision;
- (b) When the regulation criteria established by other relevant laws have become more stringent than the criteria;
- (c) When the certified product among those currently under deliberation has lost its distinctive feature in the market;
- (d) When innovative progress has been made in the technologies that are relevant to the product's environmental and quality aspect; or
- (e) When the current criteria are required to be harmonized with international standards or other relevant regulations including agreement on mutual recognition with foreign certification agency.

If criteria are deemed to require amendment or abolition, a revision proposal is prepared and submitted to the Minister of Environment. Upon confirmation of products to be subject to revision of certification criteria, the revision process is conducted in accordance with the following.

Figure 4. Process to Determine Products Subject to Revision of the Korea Eco-label Criteria

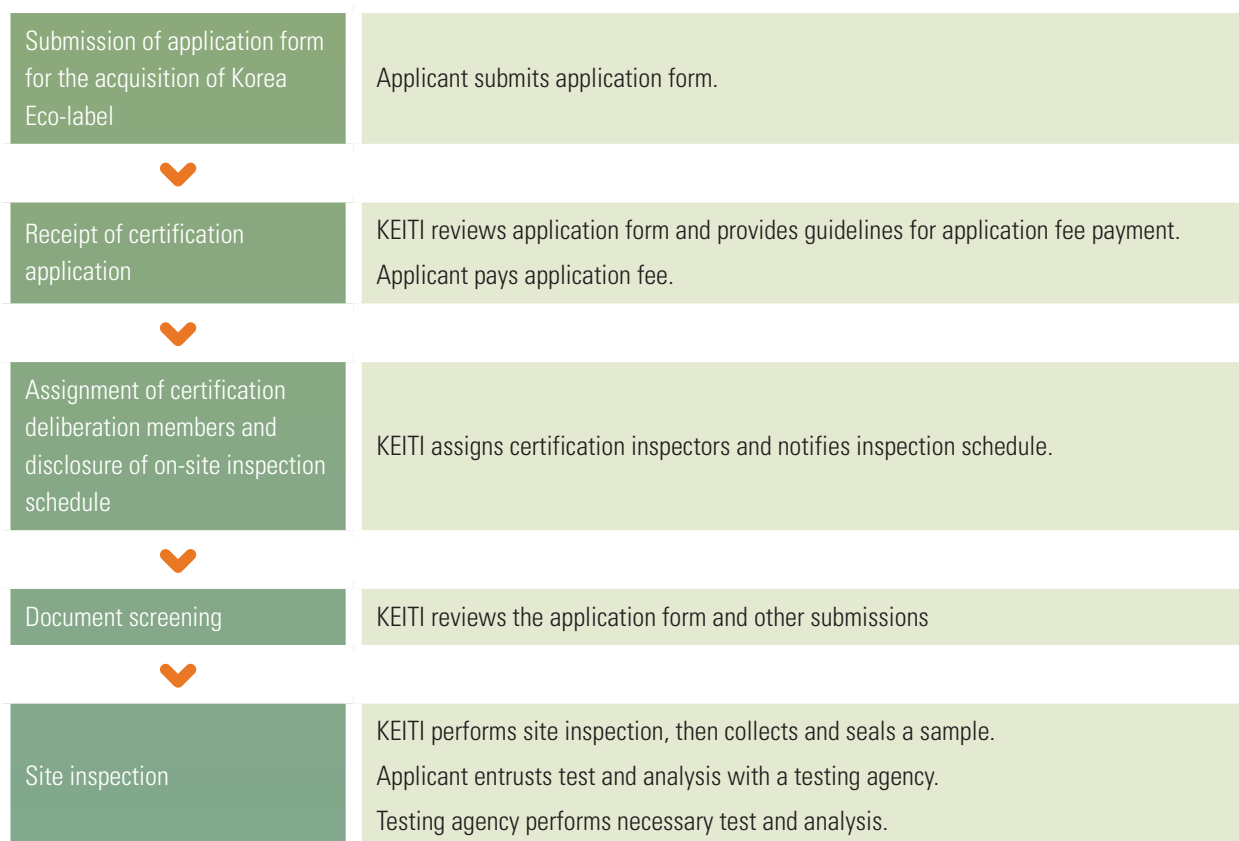


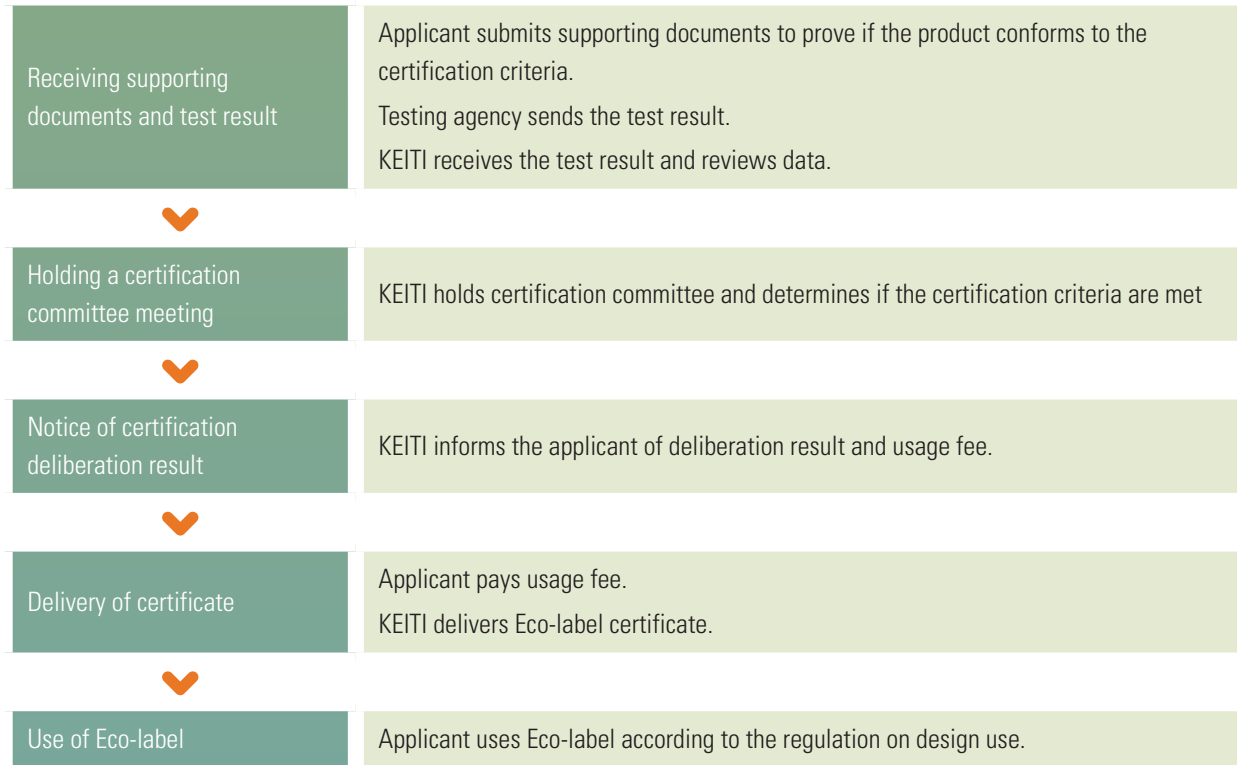
The Korea Eco-label Certification Procedure

The Eco-label Certification is granted if the candidate product for the Eco-label certification meets the certification criteria.

- If a company is willing to apply the Eco-label certification for a product that may meet the required criteria, it shall prepare an application form and submit it to the KEITI with the required fee.
- KEITI assigns an expert for deliberation and examination in relation to the certification of the product and notifies the deliberation schedule to the company.
- The certification deliberation experts conduct document screening and site inspection.
- If the sample collected from on-site inspection needs test and analysis, this work is commissioned to the relevant test institution.
- Once all data collection and review are completed, a Certification Committee is held to verify whether certification criteria are satisfied.
- The deliberation results are notified to the applicant.

Figure 5. Process to Award the the Korea Eco-label Certification



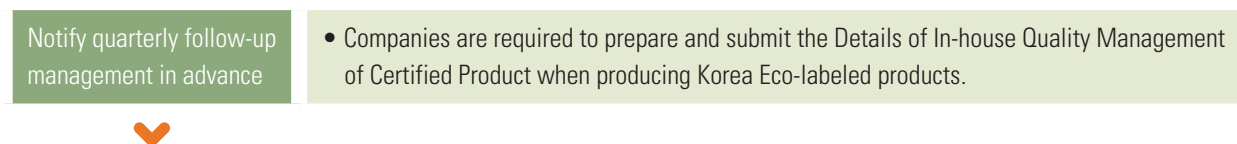


Follow-up Management of the Korea Eco-label

Follow-up management is performed in order to verify whether the Korea Eco-labeled products continue to meet the certification criteria. It aims to enhance the reliability of the Korea eco-labeling by ensuring that the product is produced and distributed in the same way as the time of certification.

In order to assess conformity with current Korea Eco-label criteria, the manufacturing plant is inspected without prior notice and annual test and analysis are performed. If a violation is uncovered through follow-up management, the hearing committee is organized to decide whether or not to revoke the certification.

Figure 6. Procedure of Investigation for Follow-up Management



<p>Select manufacturing plants to be inspected</p>	<ul style="list-style-type: none"> • Based on the Details of In-house Quality Management of Certified Product submitted by each company, manufacturing plants subject to site inspection is selected if the company is inadequate in its quality control during production or its materials and production management is likely to be changed.
	
<p>Perform pre-investigation</p>	<ul style="list-style-type: none"> • Pre-investigate product characteristics and verification criteria for the site inspection, etc. • Prepare an inspection checklist for follow-up management.
	
<p>Perform site inspection and sampling</p>	<ul style="list-style-type: none"> • Verify if the raw materials and production process for the certified product have been changed. • Verify conformity with the environmental and quality criteria during the production of the certified product. • Investigate the status of production and sales of the certified product and verify usage of the Korea Eco-label design. • Inspect the display and advertisement on the promotional materials and catalog of the certified product. • If the environmental and quality management of the product is found to be inadequate during a site inspection, samples are collected for testing.
	
<p>Report results of test and site inspection</p>	<ul style="list-style-type: none"> • Prepare an internal report on the results of test and site inspection. • If the product is assessed to be unsatisfactory based on the results of test and analysis, the relevant company is required to submit a written account of the case.
	
<p>Hold a Hearing Committee meeting for follow-up management</p>	<ul style="list-style-type: none"> • Prepare a Request for Deliberation of Follow-up Management on Eco-label Certification based on the results of site inspection, Details of In-house Quality Management of Certified Product, test report of the certified testing agency, and the written account. • If it is decided to revoke the certification in the Hearing Committee for follow-up management, request the MoE to do so. • Secondary investigation will be conducted if deemed necessary through the Hearing Committee for follow-up management, but the cost shall be borne by the certified company.
	
<p>Report final results of inspection for follow-up management</p>	<ul style="list-style-type: none"> • Compile annual performances of inspection for follow-up management and make a final report to the MoE at the end of December.

Investigation on unauthorized use of the Korea Eco-label

Investigations are conducted to uncover illegal usage of the Korea Eco-label design without certification. Investigation on unauthorized use is performed on an annual basis to enhance credibility of the Korea Eco-labeled products by preventing uncertified products from being distributed in the green market. Illegal usage of the Eco-label shall be punishable according to legislation by imprisonment for not more than two years or a fine not exceeding ten million won.

Economic and Human Resources

Budget: a total of 6,000,000 USD (as of 2014)

Project Name	Budget Allocation (unit: %)
Establishment and revision of eco-labeling criteria; development of methods to test environmental performance	25
Certification of Korea eco-label	30
Follow-up management and inspections	10
Monitoring of unauthorized Eco-label usage	5
Eco-label promotion and international cooperation	30
Total	100

Required human resource: Development of eco-label criteria (10 persons), Certification of Korea eco-label (24 persons), follow-up management and certification inspection on Eco-label (4 persons), and investigation of unauthorized use (2 persons)

IMPLEMENTING STRATEGY

Promoting the Korea Eco-labeled products through Green Public Procurement (GPP)

- In Korea, government agencies or public institutions are obliged by the Act on Promotion of Purchase of Green Products to purchase the eco-labeled products. Therefore, products awarded the Korea Eco-label have easier access to public procurement market.
- The Korean Public Procurement Service (PPS) provides incentives to the Korea Eco-labeled products in the process of reviewing bids for centralized procurements conducted by PPS.
- Incentives are given to the use of the Korea Eco-labeled products when reviewing green building certification.

Providing the application fee discounts of the certification for Small & Medium Size Enterprises (SMEs)

- The Korea Eco-label fee scheme has been improved to reduce costs and expenses borne by SMEs for certification. Subsequently, SMEs bear less burden from the Korea Eco-label use fee.

Conducting Public Outreach for the Korea Eco-label

For Consumers

- The eco-friendliness and other benefits of the Korea Eco-labeled products are promoted through a various media such as TV, radio, newspapers.
- Certified products are introduced through exhibitions and fairs, accompanied by firsthand trial events.

For Enterprises

- Companies are provided information on the benefits of the Korea Eco-labeled products in order to assist self-promotion of products.

For Government agencies and public institutions

- For procurement officials in government agencies and public institutions, education sessions are provided to promote the excellence of the Korea Eco-labeled products and encourage public purchase of green products.

MAJOR OUTCOMES

The Korea Eco-labeling has served as the core instrument of the Korean government's Sustainable Consumption and Purchase (SCP) policy. As of August of 2014, 12,244 products manufactured by 2,244 companies in 155 categories have retained their certification.

Market size for Eco-labeled products has increased by approximately 22 times from 1.5 trillion won to 34 trillion KRW (34 billion USD) in 2013, while the environmental load from product use has been reduced. Especially, Korea Eco-labeling has been instrumental in setting up the basic framework for green public procurement by providing the criteria for green products and services available for governmental procurement.

Figure 7. Market trends on Korea Eco-labeled products



The Korea Eco-label has served as an informational tool to help consumers identify and choose the environmentally-preferable products and, encourages green consumption. Public awareness on the Korea Eco-label rose from 30.5 percent in 2007 to 50.3 percent in 2013. Purchase experience of Eco-labeled products also increased from 35.4 percent to 58.4 percent.

International exchange of green products has been facilitated through international cooperation activities by joining the Global Ecolabelling Network (GEN) in 1997, concluding Mutual Recognition Agreements (MRAs) with overseas environment labeling, and pursuing joint activities including the development of standardized criteria. MRAs were signed with 11 overseas environment labeling agencies as of the end of August 2014.

In particular, eco-label certification was streamlined by, for example, exempting re-examination of common criteria through the development of common criteria for eco-labeling among Korea, China and Japan, contributing to the trade of green products in the East Asian region. Common criteria have been developed for three categories: personal computers (PCs), multifunction printers for office, and DVD recorders and players.

Table 4. MRA State Parties and Respective eco-labels

Taiwan	Thailand	Japan	Australia	China	New Zealand	Northern Europe	U.S.A.	Canada	Taiwan	Germany
2002	2002	2003	2004	2005	2006	2010	2012	2012	2013	2013
Green Mark	Green Label	Eco Mark	Good Environmental Choice	Environmental Labelling	Env. Choice	Nordic Swan	Green Seal	Eco Logo	Green Building Material	Blue Angel

STRENGTH/SUCCESS FACTORS

- The Korea Eco-labeling is a market-driven scheme designed to induce voluntary participation by both enterprises and consumers, aimed at improving product-oriented environmental performances.
- The Korea Eco-labeling has contributed to the creation of an early-stage green market, acting as a core implementation tool of the government's green procurement policy.
- Operation of the labeling is commissioned to public institute in order to ensure its objectivity and fairness as a certification scheme.
- Efforts have been made to harmonize the certification criteria with international principles and requirements, and to meet international standards and advanced regulatory guidelines regarding the environmental performance of products.

CHALLENGES/LIMITATIONS

- Although on the rise, recognition of the Korea Eco-label remains as low as around 50 percent, which similarly demonstrates a low level of consumer awareness towards eco-labeled products.
- There persists a wide gap between eco-friendly recognition and actual purchase behavior of consumers.



FUTURE PLAN

- Expanding the scope of products subject to the Korea Eco-label Certification, centering on products whose environmental performance is of strong interest for the consumers.
- Reinforcing promotional activities focusing on the benefits of green products including information on the benefits of using eco-labeled products, in order to encourage environmental consciousness among consumers with the purchase of relevant products.
- Reflecting market changes and policy demands in selecting eco-labeled product groups as well as developing certification criteria.
- Enhancing the reliability of the Korea Eco-labeling by preventing unqualified products from being distributed in the follow-up management of eco-labeled products in market.
- Strengthening support for SMEs in acquiring the Korea Eco-label by expanding fee discounts and technical consultations, thereby inducing the development and manufacture of green products

REFERENCES

- Korea Eco-labeling website in English (<http://el.keiti.re.kr/enservice/enindex.do>)
- Operational Rules of Korea Eco-labeling (December 2013)

Box 1. Types of Korea Eco-labeled Products (as of August 2014)

Office furniture and supplies categories: 21 products : 2659	 Copiers	 Document files	 Stationery	 Furniture	 chairs	
Construction materials categories : 44 products : 5487	 Water saving faucets	 Pipe for water works	 LED fixture	 Water saving toilets	 Paints	 Wood for floor decking treated with preservative
Cleaning products and household supplies categories : 21 products : 769	 Toilet paper	 Cleaners	 Bodywash	 Fabric softeners	 Toys	
ICT equipment and home furniture categories : 13 products : 368	 Television sets	 Air conditioners	 Beds	 Video media players	 Mobile phones	
Leisure, automotive, printing categories : 12 products : 29	 Tires	 Engine oil	 Fishing sinkers	 Printed matter		
Industrial equipment and materials categories: 15 products: 379	 Low noise construction machinery	 Oil products	 Printing ink	 Industrial batteries	 Buoys for fish culture	
Mixed uses categories: 25 products: 2552	 Blocks, tiles	 Copper alloys for forging	 Fire Extinguishers	 Batteries	 Electric two wheeled vehicle	
Services categories: 4 services: 2	 Hotel Services	 Car insurance services	 Car sharing Services	 Condominium services		

12,244 certified products in 154 product groups produced by 2,244 businesses

Box 2. Fee System for the Korea Eco-label

Basis: MoE Notification 2013-128 (October 14, 2013)

Application fee for the Korea Eco-label

Items	Basis of Calculation
Basic fee	50,000 KRW (50 USD) per product
Costs for site inspection	Daily unit price of a senior engineer in 'industrial plant' in the Standards for Calculating the Price of an Engineering Project, multiplied by the number of days required
Per diem and travel expenses	Travel expenses according to the Paragraph 2 of Annex 1, Classification of Travel Expenses Payment, under Article 3 of the Travel Expenses Regulations for Public Officials

Notes

1. The latest standards for calculating the price of an engineering project and per diem and travel expenses shall be applied.
2. The basic fee is also applied when an application is submitted for a derivative product of a certified product.
3. VAT is applied separately.

Annual fee of the Korea Eco-label

Annual Sales of the Product	Annual Fee (USD)
Less than 1 million USD	1,000
1 million USD or more – less than 5 million USD	2,000
5 million USD or more – less than 10 million USD	3,000
10 million USD or more – less than 50 million USD	4,000
50 million USD or more – less than 100 million USD	5,000
100 million USD or more – less than 200 million USD	7,000
200 million USD or more – less than 300 million USD	9,000
300 million USD or more	11,000

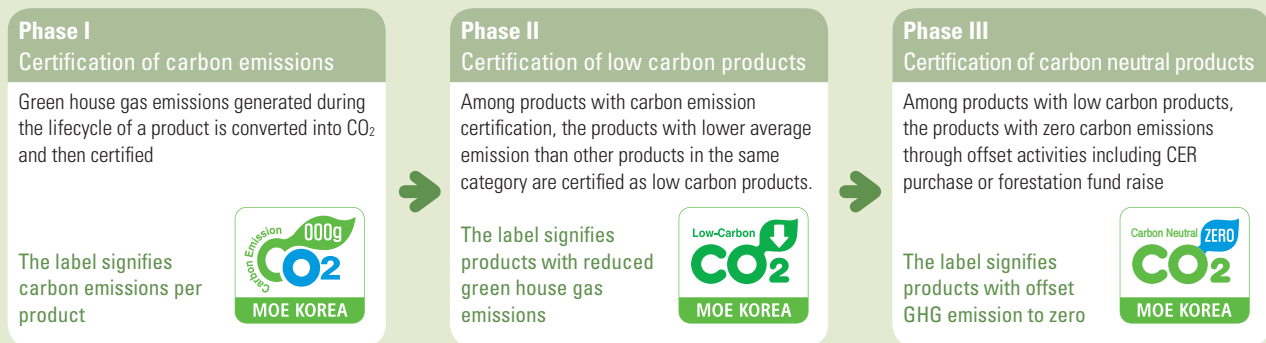
Notes

1. The annual sales of the product are that of the previous year. However, if the sales period of the preceding year falls short of a whole year, the sales are calculated as the expected one-year sales volume based on the previous year's sales.
2. Depending on the scale of the company's total sales in the previous year, usage fee is reduced prior to collection according to the following:
 - A total sales of less than 500,000 USD won (90% reduction), 500,000 USD won or more to less than 1 million USD (70% reduction), 1 million USD or more to less than 2 million USD (50% reduction), 2 million USD or more to less than 3 million USD (30% reduction)
3. VAT is applied separately.
4. If the same manufacturer acquires the Korea Eco-label for more than two products, the annual sales of each product category are aggregated. However, if two or more products are certified, an additional charge of 100,000 won per product is collected every year.
5. The application fee is paid at the time of application for the Korea Eco-label, while the annual fee is paid at the time of new certification or re-certification.
6. If the annual fee is 2 million or more, the payment can be made in two installments upon application.
7. The annual fee can be exempted for companies which donate their eco-labeled products to the Eco-House Retrofitting Project conducted by the MoE for the benefit of vulnerable social groups. In this case, the previously paid usage fee is returned. However, the exemption of usage fee shall be limited to no more than 5 million won and once a year; the donation amount shall exceed the relevant usage fee; and exemptions cannot be aggregated for multiple donations of certified products.

Carbon Footprint Labeling

The carbon footprint label is marked on a product to specify the CO₂ equivalent of greenhouse gas emissions generated in the entire lifecycle of the relevant products and services, from production, transportation, distribution, and usage to the end of product life.

Carbon footprint labeling comprises of two phases: certification of carbon emissions (Phase I), certification of low carbon products (Phase II), and certification of carbon neutral products (Phase III)



Carbon footprint labeling aims to promote low carbon and green consumption, while spurring eco-innovation of enterprises by notifying consumers of CO₂ emissions generated in the life cycle of products and services.

Legal Basis

- Article 18 (Certification of Eco-label) of the Support for Environmental Technology and Environmental Industry Act
- Article 57 (Diffusion of Culture in Production and Consumption for Green Growth) of the Framework Act on Low Carbon Green Growth
- Regulations on the Operational Procedure of Carbon Footprint Labeling (MoE Notification No. 2014-150)

Major Milestones

- February 2009: Launched carbon emissions certification (Carbon Footprint Labeling Phase I)
- November 2011: Implemented low carbon products certification (Carbon Footprint Labeling Phase II)
- November 2011: Awarded certificates for the first nine low carbon product items
- December 2012: Introduced Certification of Product Category Verification System
- September 2014: Launched carbon neutral certification (Carbon Footprint Labeling Phase III)

HOW IT WORKS

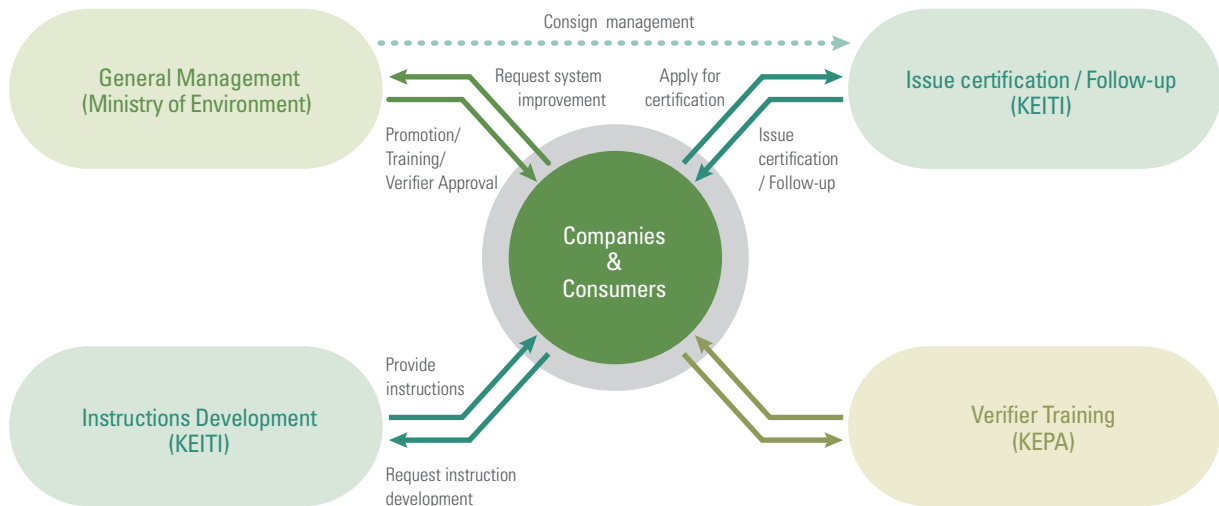
Working mechanism of Carbon Footprint Label

The Ministry of Environment governs the overall management of carbon footprint labeling.

KEITI is responsible for the development and revision of the Guidelines for Carbon Footprint of Products, certification of carbon footprint label, and follow-up management.

The Korea Environment Preservation Association (KEPA) provides education programs to train certification inspectors for carbon footprint labeling.

Figure 1. Institutional arrangements of the Carbon Footprint Labeling



Guidelines for Carbon Footprint of Products

The guidelines specify the calculation method for the amount of greenhouse gas (GHG) emissions generated from the production, transportation, distribution, use, and end of life of products. The guidelines comprise of three parts as follows:

- The Guidelines for General Products (Guidelines Set I) for products whose usage do not consume energy.
- The Guidelines for Energy-Using Products (Guidelines Set II) for products whose usage consume energy.
- The Guidelines for Usage Scenarios for each Energy-Using Product (Guidelines Set III) for energy-using products, each of which is under a different usage scenario.

> The GHG emissions of energy-using products shall be calculated in reflection of both Guidelines Set II and III.

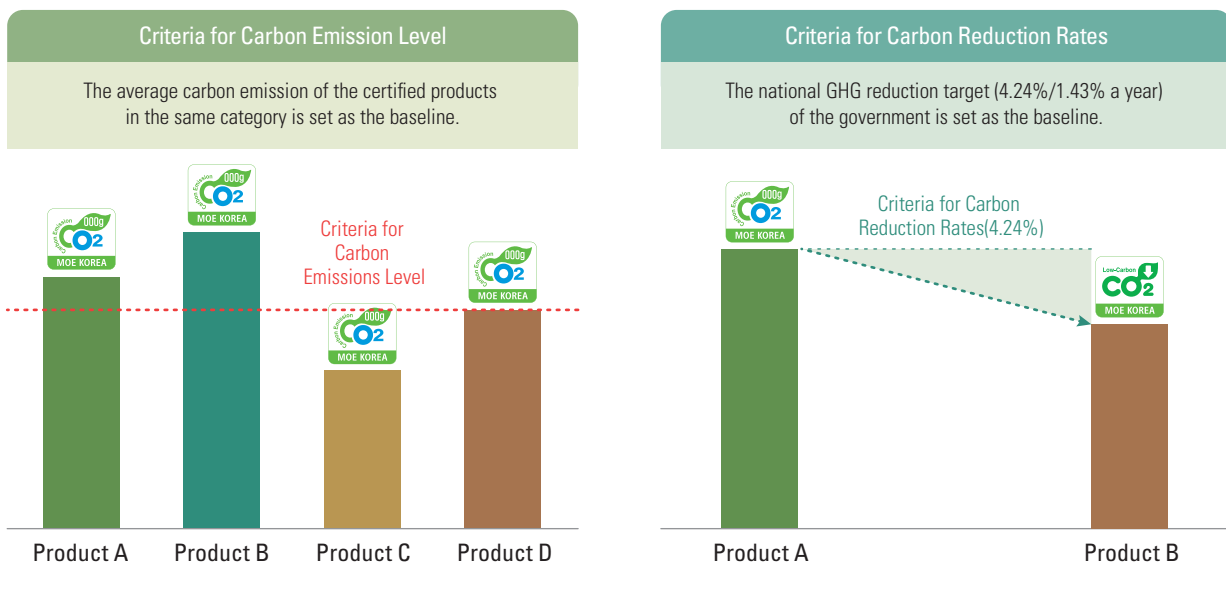
As for energy-using products which are not covered in the Guidelines for Usage Scenarios for each Energy-Using Product (Guidelines Set III), the Target Product Selection Committee may convene a meeting to establish or revise Guidelines Set III.

- As for energy-using products which are not covered in Guidelines Set III, a proposal for target product selection may be submitted.
- Comprised of internal and external experts, the Selection Subcommittee decides upon the selection of target products if deemed eligible by at least two thirds of the members.
- Once a target product is selected, a working group consisting of expert members, stakeholders of the target product, and KEITI staff, etc. is composed to hold two to three meetings for each target product in order to prepare draft guidelines.
- Also comprised of internal and external experts, the verification committee holds a meeting to establish or revise the Guidelines Set III if the proposal is deemed feasible by at least two thirds of the members.

Guidelines for Certification of Low Carbon Products

The Guideline for Certification of Low Carbon Products is composed based on the criteria for carbon emissions level and carbon reduction rates. To be certified as a low carbon product, the product shall meet both the criteria for certain carbon emissions level and carbon reduction rates. Until the end of 2017, however, certification can be granted to products which satisfy only one of the two criteria.

Figure 2. Criteria for carbon emissions level and carbon reduction rates



The Guidelines for Certification of Low Carbon Products is developed and operated by the working group and published in a preliminary notice. The verification committee is composed to determine its feasibility.

- A working group comprising of experts in the relevant field and staff of KEITI aims to develop and notify the criteria for carbon emission level and carbon reduction rate of each product category.
- The working group develops guidelines for the certification of carbon emission rates of each product category semiannually as a principle, and posts a preliminary notice of the guideline online for seven days upon completion.
- Upon receiving the written opinion of a stakeholder related to the Guidelines for Certification of Low Carbon Products, a verification committee is composed and assesses the feasibility of the guidelines.
- Members of the subcommittee prepare an assessment report on the validity of the certification guideline to be submitted to the Chairperson, who in turn compiles the results of the verification committee and reports them to the President of KEITI.
- The certification guideline is deemed feasible if unanimously agreed upon by all members of the subcommittee.

Guidelines for Certification of Product Category Verification System

The guidelines set requirements for certification of verification system that can calculate and manage the carbon emissions in each product category.

The Certification of Product Category Verification System is a process under which applicants producing multiple products with the same function are given the responsibility and authority to calculate and verify carbon emissions, following the assessment of whether the applicant has established an appropriate system such as the capacity and organizational structure in accordance with the guidelines to calculate and verify the carbon emissions of relevant products.

The guidelines cover factors necessary for an applicant company for the Certification of Product Category Verification in order to calculate carbon emissions of products and includes systemic documentation with regards to the organizational structure, human resources, data collection and calculation process, verification review procedure, and operational and management requirements.

As for methods to calculate carbon emissions and definitions of terms for those products which are not covered in these guidelines, the Guidelines for Carbon Footprint of Products shall be applied.

The guidelines require certified companies shall establish, document, implement, maintain, and improve a product category verification system on an ongoing basis.

Certified companies are given the responsibility and authority for the product category verification system and the efficient performance of carbon footprint labeling on their own products in accordance with the requirement of these guidelines. By doing so, they can also establish a foundation for systemic management of GHGs and environmental pollutants generated from business sites and products.

Procedure for Carbon Footprint Labeling

Figure 3. Certification of carbon emissions

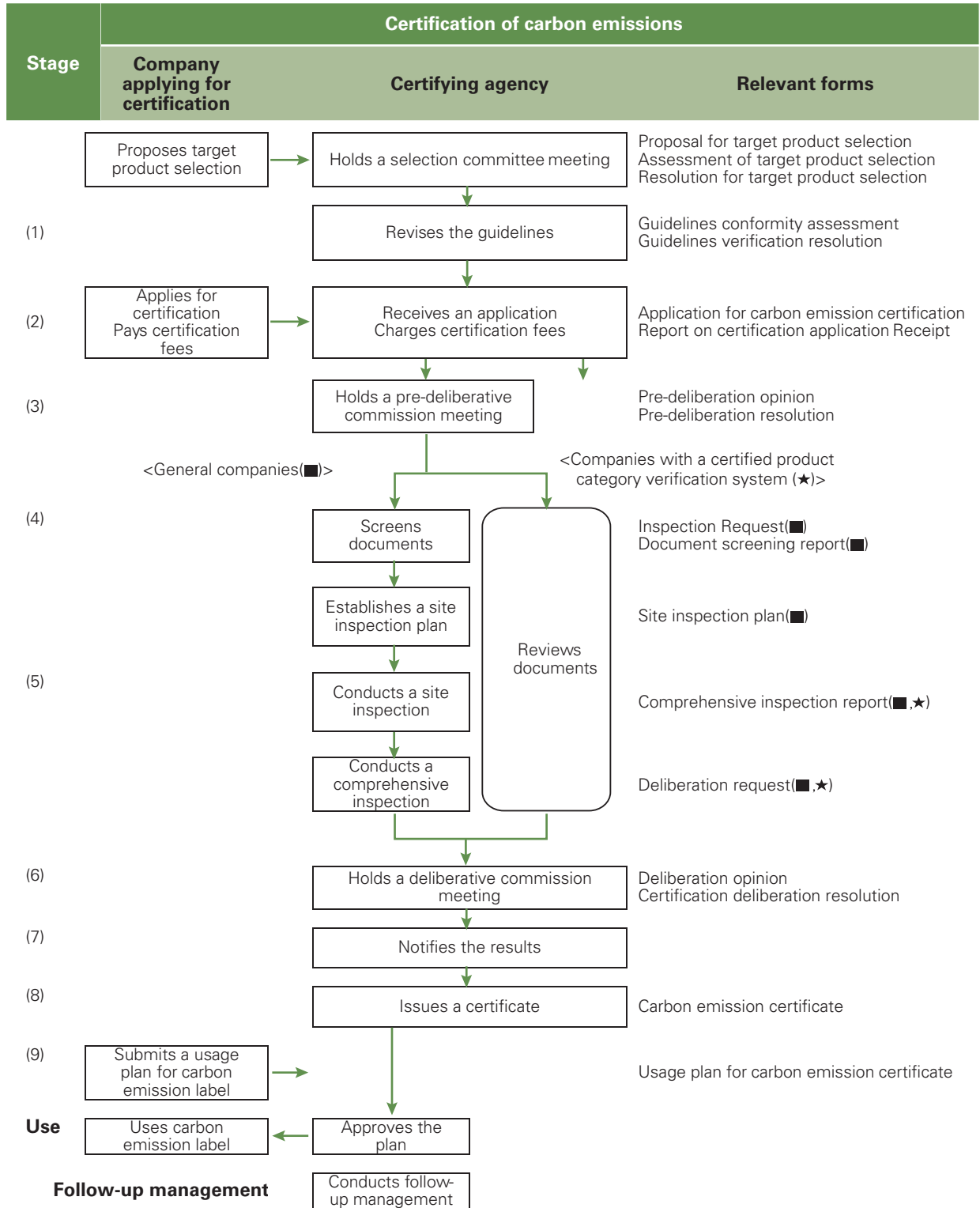


Figure 4. Certification of Low Carbon Products

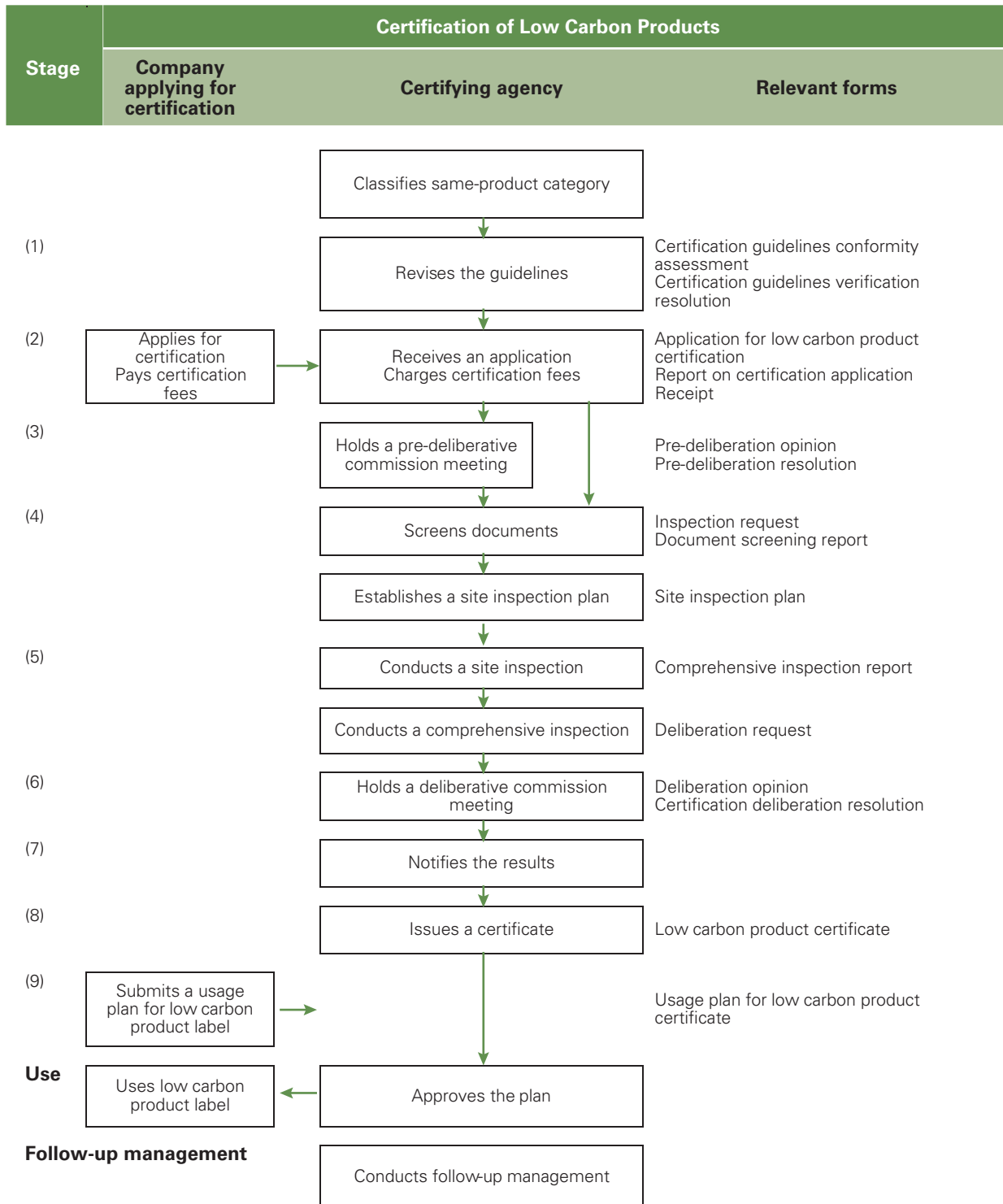
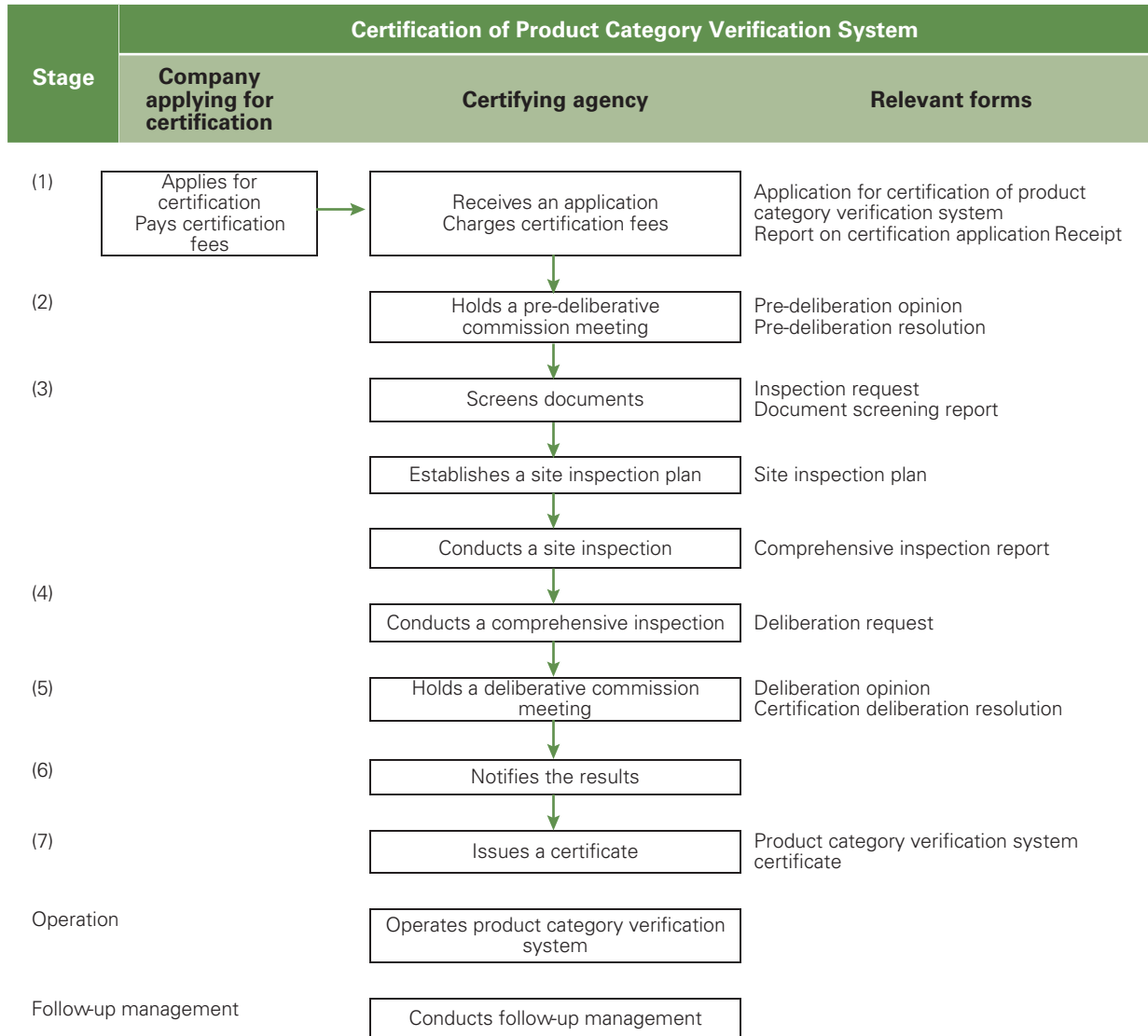


Figure 5. Certification of Product Category Verification System



Review of Application for Certification

An applicant for the carbon footprint label must submit the required documents for carbon footprint labeling – a) two copies of Application for certification, and b) Report on Application for certification to KEITI.

- “Derivative products” refer to products that are identical to their originally certified counterpart in terms of function, design and form with the exception of moderate changes to the proportion of ingredients or materials.
- “Same products” refer to products that are identical to their originally certified counterpart in terms of their function, types and proportions of raw materials contributing to GHG emissions, and consequently produce the same level of GHG emissions throughout the entire product lifecycle.

- “Changed certification” refers to the procedure to verify whether a change in the volume of carbon emission is properly calculated and submitted in accordance with the guidelines following fluctuations in emission levels as a result of partial changes in the production process or the proportion of ingredients or materials, etc. during the certification period.
- “Renewed certification” refers to the procedure to verify whether the carbon emission of a product is properly calculated in accordance with the guidelines or follow the Certification Guidelines, in cases where the certification period is expired and intended to be extended.

KEITI reviews the required documents, determines if the proposed product is qualified to be certified, and, if necessary, requests further supplementation. KEITI notifies the applicant of the Invoice for Certificate Application Fee, which must be paid by the specified date. Once the fee is paid, a third-party inspection group is allocated and notified to the applicant.

For document screening, KEITI provides the certification inspection group with the inspection request and other documents including a report on certification application and supporting data. Upon the completion of document screening, the certification inspection group sends the document screening report to the applicant. The applicant shall submit the supplementary documents, if requested in the report.

The certification inspection group coordinates the date of site inspection with the applicant, who then receives the site inspection plan. The certification inspection group performs a site inspection in accordance with the site inspection plan and evaluates issues highlighted for remedy on the document screening report.

The certification inspection group prepares the comprehensive inspection report, combining the document review and the site inspection findings. After ensuring the nonconformities have been corrected, the head of the certification inspection group prepares the deliberation request and submits it to KEITI along with the document screening report and the comprehensive inspection report. After performing corrective actions for nonconformities as required by the certification inspection group, the applicant submits the final report on certification application to the group and KEITI. Upon receiving the deliberation request from the head of the certification inspection group, KEITI determines whether it will be brought to the certification deliberative commission.

Certification Deliberative Commission and Notification of Results

The certification deliberative commission determines the validity of the results of the certification inspection and the final approval is made upon unanimous agreement by all committee members. The certification deliberative commission may request the applicant to attend the meeting as necessary, and may conditionally approve or postpone the approval if further confirmation is required to determine the final approval status.

KEITI notifies the applicant of the results within seven days from the date of deliberation and delivers the certificate for the certified product following final approval.

Use of the Label and Follow-up Management

The applicant prepares the usage plan for carbon footprint label and submits it to KEITI for approval. KEITI decides whether the plan is to be approved and notifies its decision to the applicant. The applicant uses the certified design in an appropriate way in accordance with Article 7 of the Regulations on Certification of Carbon Footprint Labeling. KEITI performs follow-up management on an annual basis starting one year from the date of certification. Any discovered nonconformity is brought to the follow-up management deliberative commission to decide upon the potential cancellation of certification.

Certification Period and Fee

Same products are considered different products if they are produced in different business sites.

The minimum number of days required for carbon footprint certification is ten days; eight for the document review and two for the site inspection. However, for each new business site added to those subject to site inspection, an additional day or two will also be added for the site inspection, potentially raising the total required period up to 20 days.

An applicant product recognized as a derivative product, including changed or renewed certification, requires six days, including four for the document review and two for the site inspection. However, if a derivative product submits an application while its counterpart applies to be certified as an original product during the same period, only a single day will be allocated for the site inspection. However, for each new business site added to those subject to site inspection, an additional day or two will also be added for the site inspection.

In case of applications for different products from the same business site, the minimum number of days for review is eight, including six for the document review and two for the site inspection. However, when different products apply at the same time, only one day will be allocated for the site inspection. However, for each new business site added to those subject to site inspection, an additional day or two will also be added for the site inspection.

Table 1. Certification fee rates

Expense item	Calculation Details
Basic fee	50,000 KRW (50 USD) per product
Costs for certification review	Unit wage of an engineer in 'industrial plant' in the Calculation Standards for Engineering Project Costs, multiplied by the number of days required for the review (including document review and site inspection)
Overheads	110% of costs for certification review
Per diem and travel expenses	Applies criteria for travel expense payment as specified by the certifying agency

Withdrawal of Carbon Footprint Label

KEITI may cancel the certification according to the resolution of the follow-up management deliberative commission, if the certified company is found responsible for any of the following cases:

- If the company has acquired the certification in an illegal way;
- If the company misuses the carbon footprint label on materials or products different from those on the certification content, or products are distributed with labels displaying information different from the actual certification results;
- If the company has not distributed the carbon footprint labeled material or product for one year or longer without unavoidable reasons such as a natural disaster.

If the certification of a company is canceled, the company cannot apply for certification within a year from the date of cancelation.

Economic and Human Resources

Budget: a total of 2,365,000 USD (As of 2014)

Project names	Distribution of budget (unit: %)
Operation of carbon footprint labeling	48
Certification review for carbon footprint label	34
Development of program for voluntary participation in GHG reduction	14
Production and distribution of materials for Policy Customer Relationship Management (PCRM) related to climate change	4
Total	100

Required human resources

- Certification review for carbon footprint label: 8 persons
- Follow-up management and investigation of unauthorized use: 2 persons
- Operation of GHG reduction project in the non-industrial sector: 2 persons
- International cooperation and promotional activities for carbon footprint labeling: 4 persons

IMPLEMENTING STRATEGY

Providing Incentives for carbon-labeled products

In line with the Green Standard of Energy and Environmental Design (G-SEED), a new assessment item, 'displaying carbon emission information of the ingredient material,' is added to give a maximum of two points for the use of building materials marked with the carbon footprint label.

In line with the integrated system of the Korean Public Procurement Service (PPS), carbon emission information in the carbon footprint labeling is used as a criteria item for environmental assessment in evaluating bids for electrical appliances. Four types of products are applicable: washing machines, air conditioners, personal computers, and LCD monitors.

In line with the Green Credit Card, buyers of carbon footprint labeled products are awarded Eco-money points, which can be used like cash.

Offering capacity building to enterprises and inspectors

On and off-line education for 'theory and practice of life cycle assessment' is provided to working-level personnel in order to allow the applicant company for carbon footprint label can independently perform the lifecycle assessment (LCA) and calculate carbon emissions. Offline education is offered four times a year to help the working-level personnel in the carbon footprint labeled companies better understand the LCA, and to provide training for calculation of carbon emissions. Online education for 'theory and practice of lifecycle assessment' is open and offered four times a year through the cyber environmental practice education system at the Korean National Environmental Technology Information Center (<http://konetic.ecoedu.go.kr>).

'Online professional course for calculation and management of GHG emissions (carbon footprint)' is offered through the cyber environmental practice education system at the Korean National Environmental Technology Information Center (<http://konetic.ecoedu.go.kr>). The topics covered in the education are as follows: an overview of the LCA; calculation method for GHS emissions; and method for preparation of the report on certification of carbon footprint label

Supplementary education is administered semiannually for certification inspectors to strengthen their capabilities and ensure greater effectiveness in the certification process through education on methods for the review of carbon footprint labeling and case study of certification for each product category.

Additional tailored assistances were given to engage SMEs and energy-intensive enterprises by providing guidance on how to calculate carbon emission and how to adopt the Certification of Product Category Verification System, as well as reducing certification fees.

Conducting Public Outreach

Promotional videos are produced to advertise carbon footprint labeling via various media such as outdoor displays and public transportation including subway, KTX, etc.

Special programs such as documentaries, campaign song related to carbon footprint labeling are planned and produced to be aired through the major national broadcasters.

Search keywords related to carbon footprint labeling are registered with major Internet portal sites, and SNS accounts such as Twitter and Facebook are opened and operated.

Carbon footprint labeling is promoted through promotional webtoons and science textbooks for children, in order to convey as friendly a public image as possible.

A supporters' group comprised of university students, 'Eco-Friends' is to be actively engaged with creative ideas in on-and-offline promotional activities.

Promotional booths are operated at environment related exhibits and events in Korea and abroad, while permanent exhibits for carbon footprint labeled products are established for promotional purposes.



MAJOR OUTCOMES

As the number of carbon footprint labeled products continue to increase, carbon footprint labeling has emerged as the core certification system in efforts to address climate change. The number of carbon footprint labeled products has reached at 1,667 as of the end of 2014, thereby ranking the Republic of Korea at second place in the world with regards to the number of certified products.

As of 2014, a total of 1,667 products are awarded the Carbon Footprint Label, recording an annual average increase of 33 percent since it was first introduced in 2009. Certification of carbon emission (Phase I), certification of low carbon product (Phase II), and certification of carbon neutral products (Phase III) have been granted to 1390, 264, and 13 products, respectively. As for the proportions of major product categories (as of 2014), non-durable goods such as detergents and food accounts for 38 percent followed by energy-using products such as automobiles and computers (39%), production goods (20%), services (1%) and durable goods (2%).

Figure 6. Trends in the number of carbon footprint labeled products

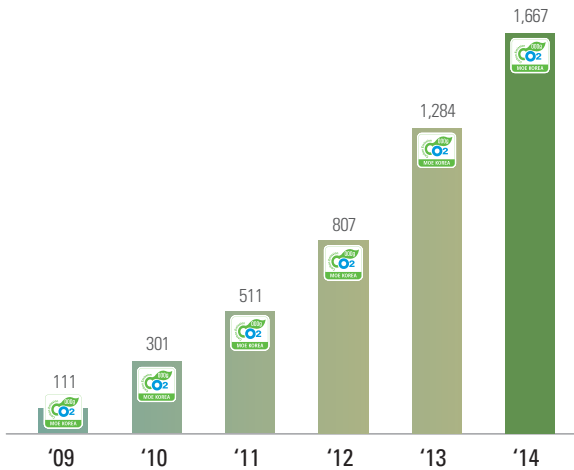
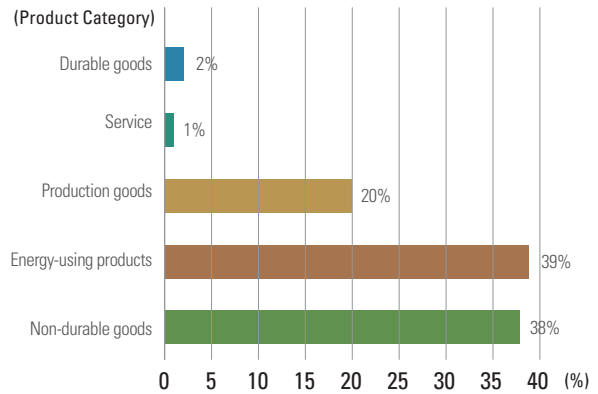


Figure 7. Types of carbon footprint labeled products(2014)



Introduced in Korea for the first in the world, the low carbon certification (Phase II) is benchmarked by foreign countries. The accumulated reduction of GHG caused by the certification of low carbon products reached over 2.30 million tons by 2014.

The Asia Carbon Footprint Network (ACFN) began as an endeavor to share information and reinforce cooperation among operating agencies of carbon footprint labeling in the Asia region. Launched in October 2013, the ACFN is a voluntary consultative body designed to enhance cooperation for carbon footprint labeling among 14 agencies across nine countries in Asia including China, Thailand, and the Philippines. KEITI and the Economic and Social Commission for Asia and Pacific (UNESCAP) serve as a secretariat for the ACFN.

Asia Carbon Footprint Seminars and ACFN workshops aim to transfer knowhow and experiences of carbon footprint labeling from more advanced countries to the countries that wish to introduce and improve the systems. The efficacy and utilization methods of carbon footprint labeling in Korea is disseminated in countries without equivalent systems in order to expand the international carbon footprint labeling regime.



STRENGTH/SUCCESS FACTORS

- Carbon footprint labeling helps to sensitize consumers to GHG emission generated for their use of products and services, and further encourage consumers to choose low carbon products using two different certification system.
- Companies can have a better understanding on GHG emission throughout a product's life cycle, which helps assess and identify potential rooms for carbon emission reduction.
- Carbon footprint labeling, especially low carbon certification, is implemented in a way to contribute to meeting national GHG emission reduction target.

CHALLENGES/LIMITATIONS

- The benefits for acquiring the carbon footprint label are not sufficient enough to engage broader stakeholder groups.
- Due to the lack of experts, it is difficult to actively respond to recent issues of international standardization such as water usage footprint.
- There are not enough promotional and educational activities specialized for each target group such as children, youths, and housewives.
- The Life Cycle Assessment costs required for the certification per product could be costly for SMEs.

FUTURE PLAN

- Boosting the satisfaction of certified companies by reinforcing incentives for carbon footprint labeling and expanding support for the certification of SMEs and high-potential enterprises.
- Proactively responding to other certification systems currently under debate in the international community, such as carbon neutral certification and water footprint.
- Expanding ACFN membership through the establishment of an online and offline cooperative platform in order to vitalize the network.

REFERENCES

- Carbon footprint labeling website (in English): <http://www.edp.or.kr>
- Asia Carbon Footprint Network: <http://www.acfnetwork.net>
- Guideline for Carbon Footprint of Products (August 2009)

Box 1. Types of Carbon Footprint Labeled Products (as of Dec. 2014)

Classification	Number of products	Certified products
Non-durable general goods	635	Shampoo, detergents, milk, confectionary, beverages, etc. 
Durable general goods	27	Office chairs, air-tight containers, adhesive sheets, etc. 
General production goods	334	Wallpapers, tiles, gypsum boards, storage batteries, etc. 
Services	23	Railroads, air transportation, banking services, etc. 
Energy-using durable goods	648	Television sets, computers, mobile phones, vacuum cleaners, refrigerators, washing machines, etc., 

Green Building Certification

G-SEED

Green Standard for Energy and Environmental Design

The Green Standard for Energy and Environmental Design (G-SEED) is a green building certification to rate the environmental performance of buildings in Korea throughout the lifecycle from design, construction, maintenance and management to demolition. G-SEED takes into account various environmental factors including energy and resource conservation, reduction of pollutant emissions, level of comfort, and harmony with surroundings.



G-SEED aims to

- Encourage consumers to make an informed decision and develop eco-friendly consumption pattern;
- Increase marketability of eco-friendly products and encourage manufacturers to develop eco-friendly products;
- Minimize adverse environmental impacts arising from production and consumption of goods or services;
- Contribute to green growth by developing the criteria for eco-labeling and certifying eco-labels for domestic green products.

Legal Basis

- Act on Support for the Establishment of Green Buildings, Ministry of Land, Infrastructure and Transport (MOLIT) (February 2013)
- Regulation on Green Building Certification, MoE & MOLIT Ordinance (June 2013)
- Green Building Certification Criteria, MOE & MOLIT Notification (June 2013)



Major Milestones

- January 2002: The Ministry of Construction and Transportation (MOCT, Former name of the Ministry of Land, Infrastructure and Transport) and the MoE jointly launched the eco-friendly building certification system on multi-residential buildings.
- January 2003: The MOCT and the MoE jointly launched the eco-friendly building certification system on office buildings and residential complexes.
- March 2005: Launched eco-friendly building certification on school buildings. Public schools constructed by public institutions with a total floor area greater than 3,000 square meters have been obligated to obtain green building certification.
- November 2005: Newly inserted Article 58 (Certification of Eco-friendly Buildings) of the Building Act.
- September 2006: Commenced implementation of the eco-friendly building certification system on accommodations and sales facilities.
- March 2010: Commenced enforcement of the Guidelines for Efficient Energy Usage in Public Institutions. Buildings constructed by public institutions with a total floor area greater than 10,000 square meters have been obligated to obtain eco-friendly building certification.
- February 2013: Commenced enforcement of the Act on Support for the Establishment of Green Buildings.
- June 2013: Commenced enforcement of the amended Green Buildings Certification Criteria.

HOW IT WORKS

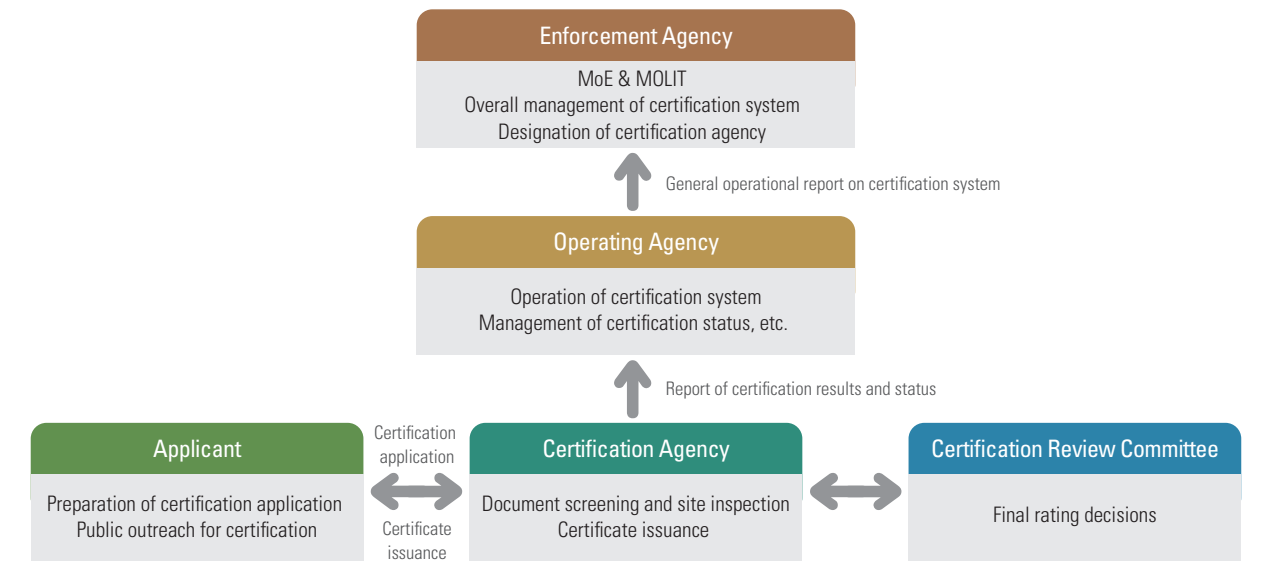
Working mechanism of G-SEED

The MOLIT and the MoE are responsible for the overall management of G-SEED including the establishment and revision of the relevant laws and regulations.

Korea Institute of Civil Engineering and Building Technology (KICT) is responsible for the establishment, revision, and management of the G-SEED Criteria, the operation of certification, public outreach and education related to G-SEED, and international cooperation.

A total of 10 agencies, consisting of five public institutions and five private organizations, are designated as certification agencies.

Figure 1. Institutional arrangements of the G-SEED

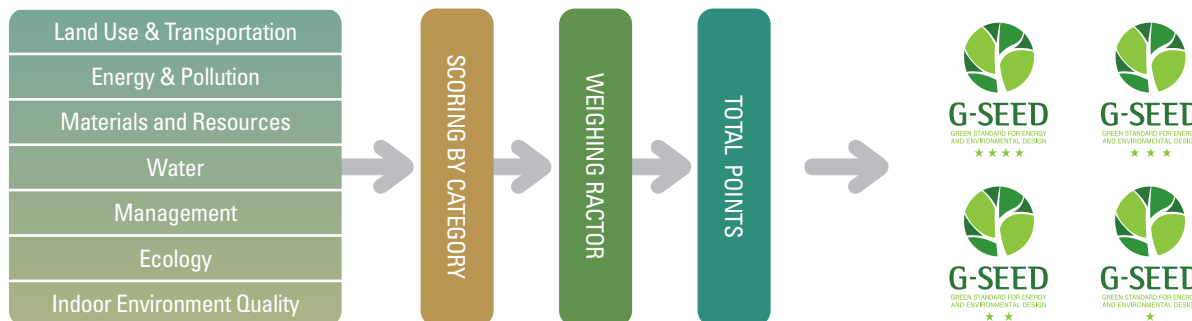


Certification criteria and target

Environmental performance of buildings is assessed in seven categories: land use and transportation; energy use and environmental pollution; materials and resources use; management of water circulation; maintenance and management (operation); ecology; and indoor environment quality.

Detailed criteria for each category vary depending on types of buildings including multi-residential buildings; complex buildings; office buildings; school facilities; sales facilities; accommodations; small houses; existing multi-residential buildings; existing office buildings; and other types of buildings.

Figure 2. Overview of the G-SEED certification



The G-SEED certification can be applied to

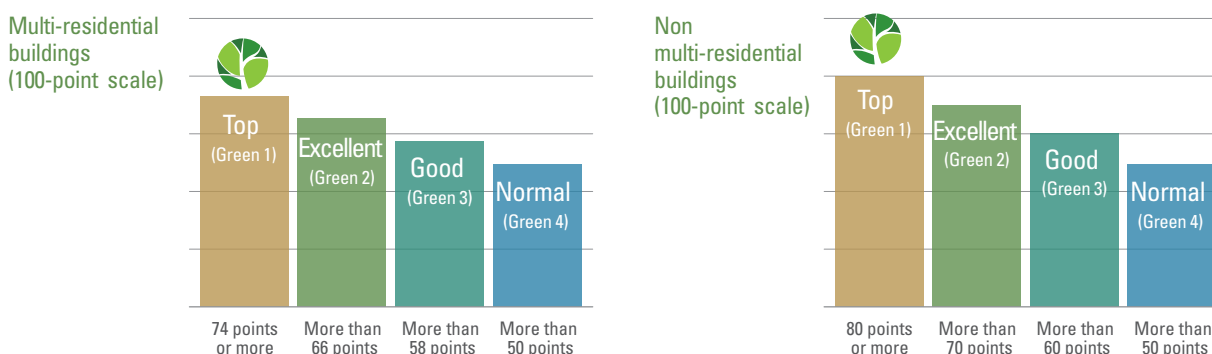
- All new buildings within three years after the acquisition of the original usage approval or usage inspection.
- Existing multi-residential buildings or existing office buildings

Mandatory certification applies to constructions contracted out by public institutions with a total floor area greater than 3,000 square meters.

Certification Rating

There are four grades of the G-SEED certification, which is comprised of Top (Green 1), Excellent (Green 2), Good (Green 3), and Normal (Green 4). The number of points a building earns determines the level of the certification.

Figure 3. Rating system of G-SEED

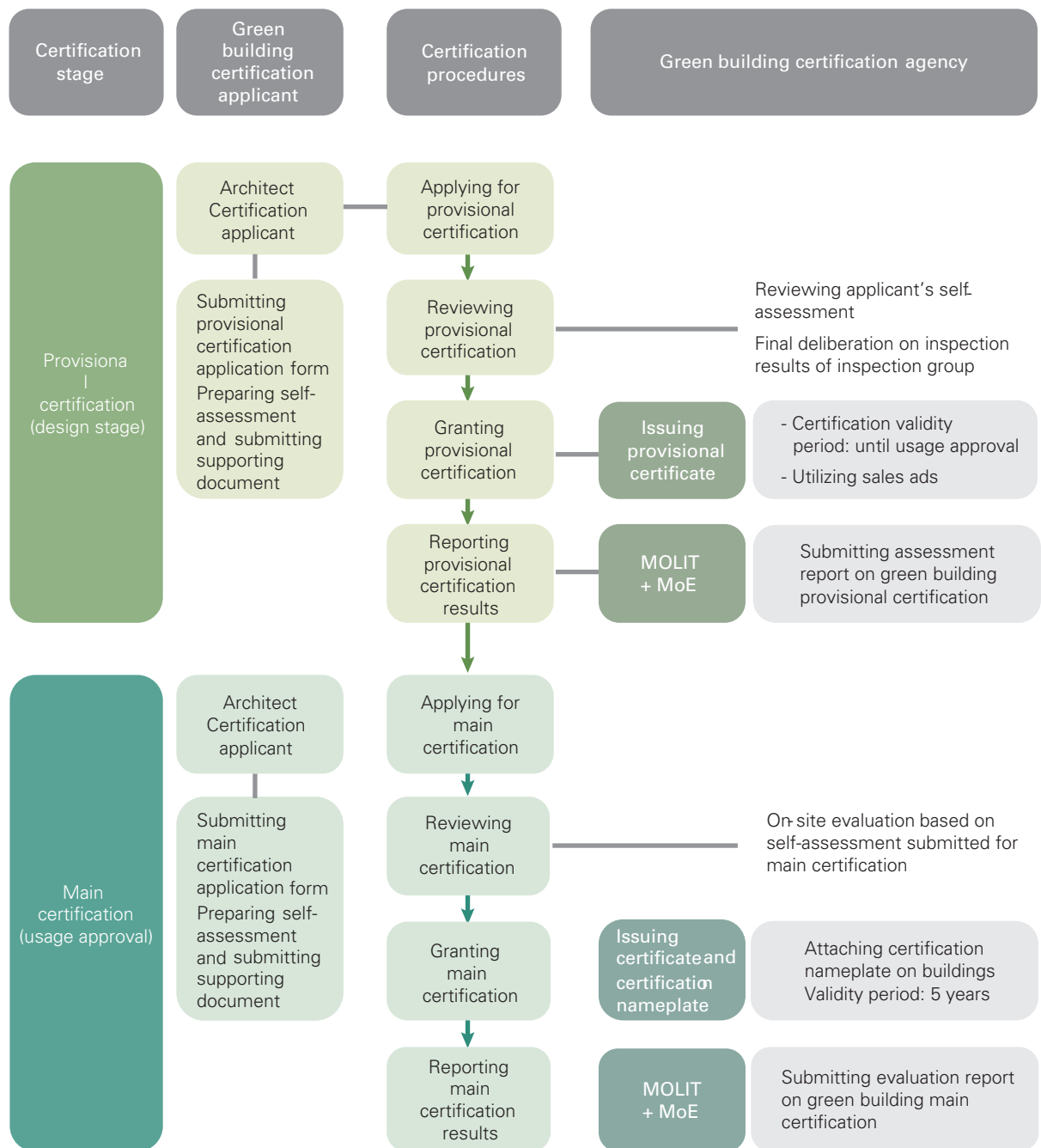


Provisional certification is valid from the date of original issuance and expires on the date of completion for the usage inspection or approval, while main certification is valid for five years from the date of certification.

Certification procedures

In order to be certified by G-SEED, the building owner or the construction company with owner's consent should submit a certification application form to a certification agency. A building that has obtained the usage approval is allowed to apply for certification at any stage, although the provisional certification must be obtained at the design stage.

Figure 4. Process of G-SEED Certification





Incentives for G-SEED

Local tax breaks and exemption are given to Top-grade and Excellent-grade G-SEED buildings in accordance with the Article 47 of the Restriction of Special Local Taxation Act.

Acquisition tax (formerly, acquisition tax and registration tax) reduction and exemption	Top Grade	Excellent Grade
Level 1 of energy efficiency certification or energy performance index (EPI) of 90 points or more	15%	10%
Level 2 of energy efficiency certification or EPI of 80 points or more and less than 90 points	10%	5%

Top-grade and Excellent-grade G-SEED buildings are allowed to ease architectural criteria including floor area ratio, ecological area, and building height limit in accordance with the Articles 16 and 17 of the Energy-saving Design Criteria for Architecture.

Classification	Top Grade	Excellent Grade
Level 1 of energy efficiency certification or EPI of 90 points or more	12%	8%
Level 2 of energy efficiency certification or EPI of 80 points or more and less than 90 points	8%	4%

G-SEED certification buildings are eligible for the reduction in environment improvement charges as follows:

Certification Rating	Top (Green 1)	Excellent (Green 2)	Good (Green 3)	Normal (Green 4)
Reduction rate	50%	40%	30%	20%

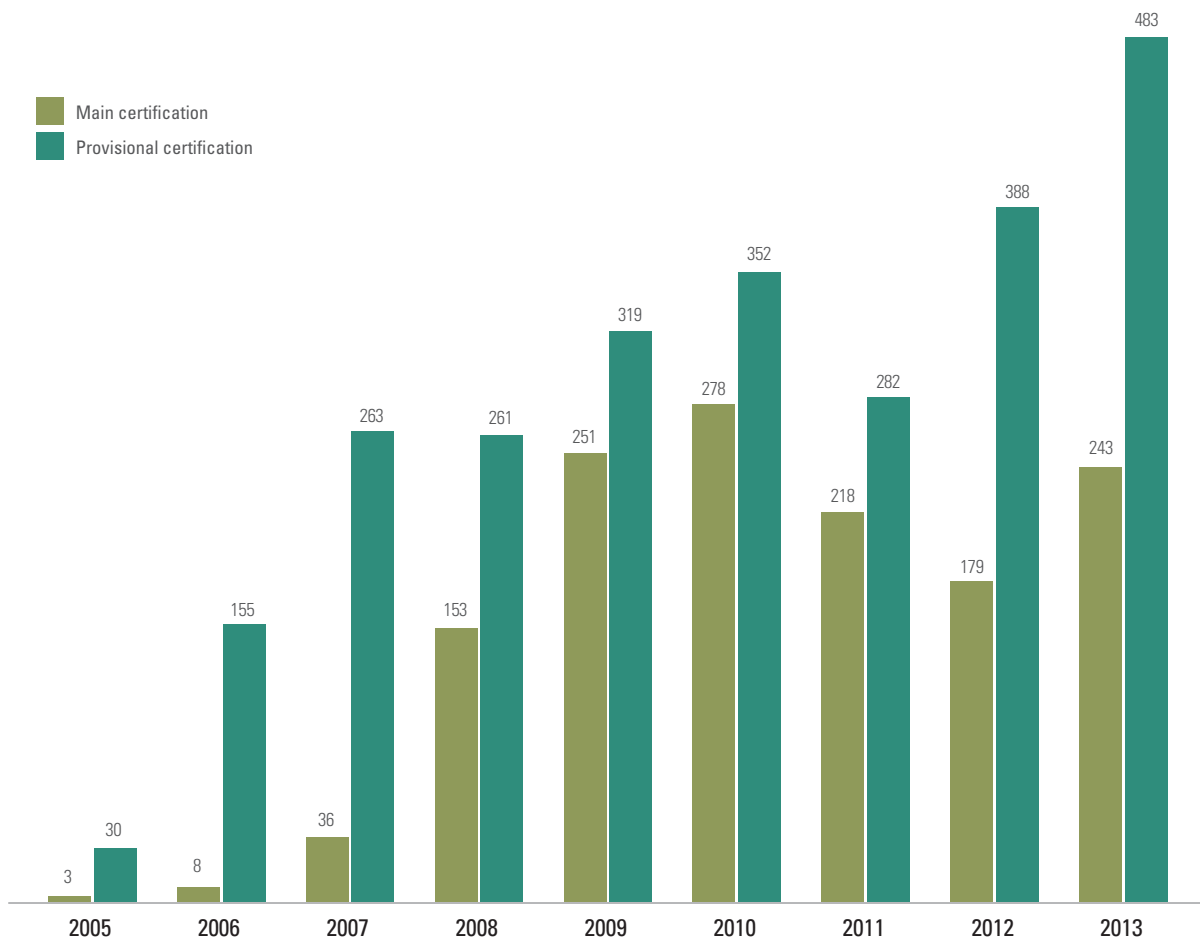
MAJOR OUTCOME

As of December 2013, the total number of certifications reached 3,923, including 2,551 provisional certifications and 1,372 main certifications.

- Three certifications were granted in 2002 and 2003, respectively.

- In 2006, a three percent addition to the calculation of the pre-sale price of multi-residential buildings with the G-SEED certification resulted in increased certifications of multi-residential buildings.
- In 2008, the number of school facilities with the G-SEED certification increased as newly-constructed school buildings were obligated to obtain the said certification.
- In 2010, the number of G-SEED certifications rose steadily as a result of a reduction in acquisition tax and registration tax, and environment improvement charges. The increases in the number of G-SEED also attribute to the new regulation that obligates buildings constructed by public institutions with a total floor area greater than 10,000 square meters to obtain eco-friendly building certification.
- Since September 2013, mandatory certification has been expanded to public buildings with a total floor area greater than 3,000 square meters, and therefore the number of certifications is expected to increase significantly in the future.

Figure 5. Trends in G-SEED certification by year (from 2005 to 2013)





FUTURE PLAN

- Expanding the application of G-SEED certification to all types of building
- Improving the certification criteria in a way to harmonize with other related programs, reflect the trends in eco-industry & technology, and to address compelling environmental challenges.
- Developing G-SEED certification in a way to incorporate economic, social and environmental aspects in a balanced way, thereby moving towards sustainable building.

REFERENCES

G-SEED website <http://www.g-seed.or.kr/>

Green Store Certification

Green store certification is to indicate green store that facilitates the supply of green products to consumers and strive to improve the overall environmental management. It aims to encourage energy conservation and GHG emission reduction among retail stores and promote easy access to green products for consumers.



Legal Basis

Article 18 (Vitalization of Sale of Green Products) of the Act on Promotion of Purchase of Green Products

Major Milestones

- 2009: Carried out research to formulate measures to promote eco-friendly retail stores.
- 2010: Performed a pilot green store project targeting large retail stores.
- October 2011: Established legal grounds for the green store certification and initiated the green store certification.
- 2011: Conducted a 2nd-phase project for SMEs such as specialty shops for eco-friendly agricultural products and green products.
- 2012: Conducted a 3rd-phase project for convenience stores.



HOW IT WORKS

Working Mechanism of Green Store Certification

The MoE carries out overall management of the green store certification, including establishment and revision of related laws and regulations.

KEITI prepares establishment and revision of criteria for the certification of green stores, certifies and conducts follow-up management of green stores, and performs education and public outreach on green stores.

Deliberation committee for green store certification decides on whether to certify green stores.

Retail stores fulfill the requirements for green stores and apply for certification.

Target Stores

- Superstores, including discount stores, department stores, and shopping centers, prescribed by Presidential Decree
- Integrated distribution center of agricultural and fishery products with a floor space of 3,000 square meters or greater
- Retail stores operated by consumer cooperatives established under Article 21 of the Consumer Cooperatives Act
- Stores operated by Eco-label certified companies
- Non-specialized retail stores focusing on foods and beverages classified according to the Korean Standard Industrial Classification (KSIC)

Certification Criteria

Pursuant to Article 5 of the Enforcement Rules of the Act on Promotion of Purchase of Green Products, the following criteria should be satisfied in order to be certified as green store:

- Establishment of an environmental management system, including environmental goals
- Formulation of ways to supply green products, including sales expansion and promotion of green products
- Eco-friendly operation of stores, including measures to reduce pollution and conserve energy
- Development of customer-oriented environmental management schemes, including sharing vision on environmental management with customers and encouraging customer engagement

According to the MoE notification of the Criteria for the Certification of Green Stores (February 2012), superstores are required to acquire more than 160 credits out of 200 credits in total across 39 items in three major categories—

a) environmental management system, b) environmental management activity, and c) improvement of environmental performance. Small- and medium-sized stores need to earn 80 credits out of 100 credits in total across 18 items. Additional 10 credits can be provided on top of the initial assessment based on the criteria.

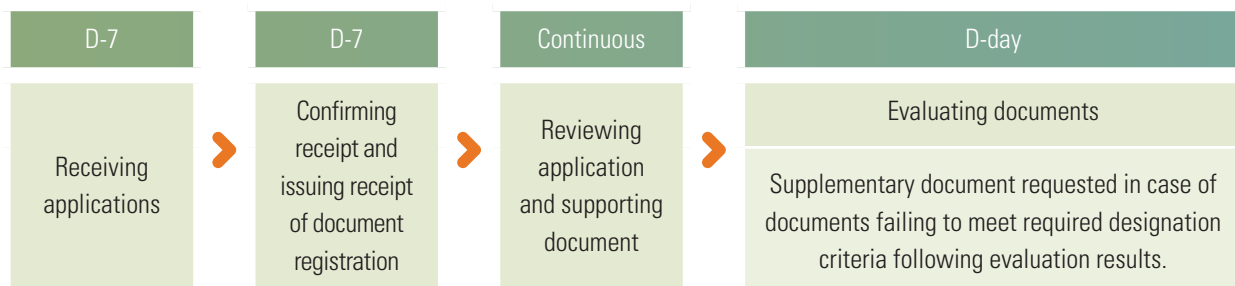
Table 1. Certification criteria for green store

Classification	Major Category	Sub-major Category	No. of Items	Total Credits (Additional Credits)	
Superstores	Management system	Environmental management	7	95(6)	
		Supply of green products	3		
		Building and facility management	5		
		Logistics management	2		
		Environmental management of partner companies	2		
	Management activity	Sales and promotion of green products	5	55(3)	
		Reduction of environmental load on store operation	3		
		Awareness raising and engagement of customers	6		
	Improvement of environmental performance	Energy use and GHG emissions	2	50(1)	
		Use of resource and waste generation	2		
		Supply of green products	2		
	Total			39	200(10)
	Small- and medium-sized stores	Management system	Environmental management	4	30(2)
Energy management			1		
Waste management			1		
Management activity		Sales and promotion of green products	3	50(3)	
		Reduction of environmental load on store operation	5		
		Awareness raising and engagement of customers	2		
Improvement of environmental performance		Energy use	1	20	
		Supply of green products	1		
Total			18	100(5)	

Certification Procedures for Green Stores

1. Receiving application for green store certification.

Stores interested in certification as a green store shall submit an application along with supporting document to the KEITI. If an applicant fails to submit required supporting document by the final due date of the second supplementation request, the applicant is deemed to have withdrawn the initial certification application.



2. Document screening

Application documents are screened by KEITI against the criteria for the certification. Applicants obtaining more than 80 percent of overall credits and more than 50 percent of credits for each category are eligible for site inspection.

Figure 1. Sample of Document Evaluation Report

1. Evaluation results per Store

A. Superstores

Category Name of store	Management System	Management Activity	Improvement of Environmental Performance	Total Credits	Criteria (80%)
A	25.5/40	22/25	60.2/65	163.3/195	156
B	23.5/45	22/25	59.6/65	161.9/200	160
C	25.5/45	22/25	57.2/65	160.3/196	156.8

I hereby report the results of document evaluation as above.

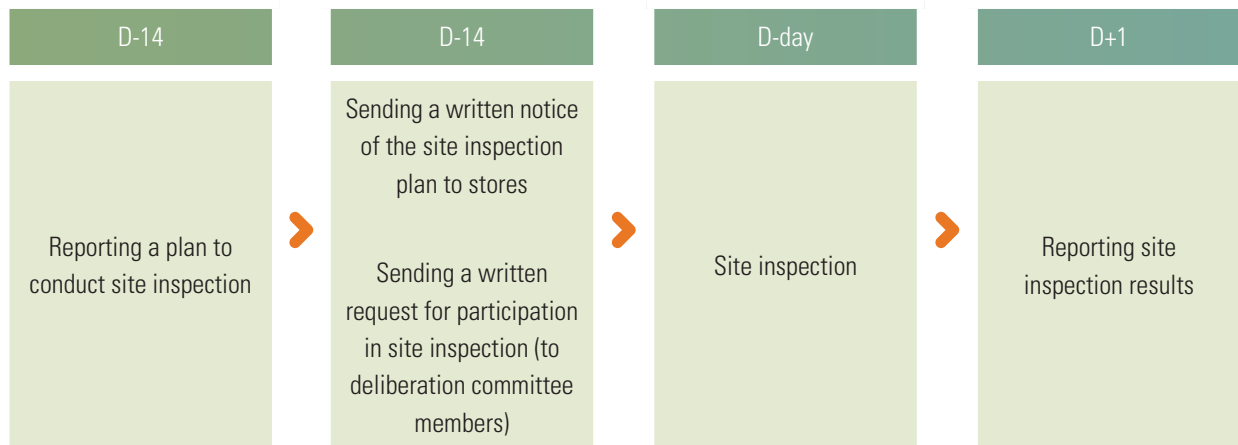
Date:

Person in charge

Responsible researcher: **OOO**

3. Site inspection

The purpose of site inspection is to verifying whether the details of documents submitted match the operational status at the actual site. A site inspection group is comprised of more than two members, including KEITI researchers and external expert members.



4. Comprehensive evaluation

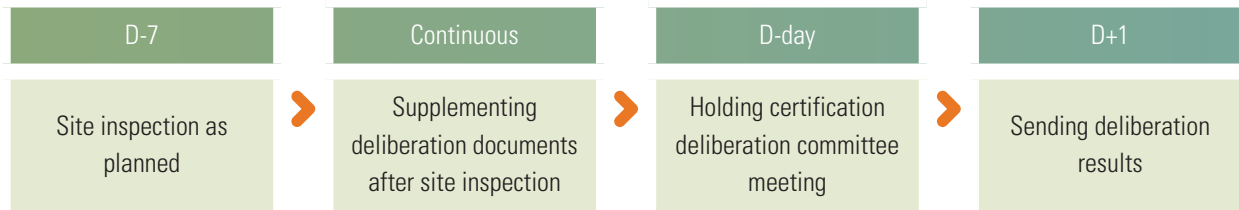
The deliberation committee is organized in order to determine whether store applicants comply with standards for the green store certification based on document evaluation and site inspection results.

A meeting of the deliberation committee shall open with the attendance of more than two-thirds of the registered members of the committee, and a decision requires the affirmative vote of more than two-thirds of the members present.

The officer in charge and expert members shall explain the results of document evaluation and site inspection to the committee members at the deliberation committee.

The members of the deliberation committee shall draw up their deliberation opinion based on the document evaluation results and site inspection result report.

The chairperson of the deliberation committee shall compile the written opinions and write a resolution for certification deliberation.



Economic and Human Resources

There are 3 researchers responsible for the operation of the green store certification, 1 person for overall management, 1 person for inspection for certification of green stores, and 1 person for follow-up management of certified stores.

About 300 million KRW (300,000 USD) is required, including Personnel expenses (100 million KRW (100,000 USD)), inspection allowances and travel expenses (100 million KRW (100,000 USD)), and public outreach and follow-up management of green stores (100 million KRW (100,000 USD)).

IMPLEMENTING STRATEGY

- Twenty to 50 percent of tax breaks are offered on environment improvement charges paid by retail stores in accordance with the revision of the Environment Improvement Expense Liability Act
- Consultation meetings among stakeholders are convened as a channel to collect their opinions and improve the system on a regular basis. In addition, individual consultations are held for different types of retailers including large retailers, and small- and medium-sized retailers.
- Technical support is provided for small- and medium-sized stores to obtain green store certification.

MAJOR OUTCOMES

The number of green store has increased from 104 in 2012 to 253 stores in 2014. In addition, it has been successful in engaging a variety of retailers, such as electronics appliances and organic product stores.

The green store certification lays the foundation for greening retail chains. Support from large retail stores has helped small- and medium-sized, neighborhood-oriented supermarkets situated near large supermarkets to become green stores and to strengthen their self-reliance.

Table 2. The Status of Green Store Certification

Classification	Name of Company	No. of Stores
Department stores	Galleria Department Store	5
	Lotte Department Store	16
Large supermarkets	Lotte Mart	86
	E-Mart	48
Specialized organic food stores	Mugonghae	5
	Chorocmaeul	67
	Orga Whole Foods	6
Specialized electronics stores	Samsung Digital Plaza	5
Consumer cooperative stores		8
Small neighborhood-oriented supermarkets		7
Total		253

STRENGTH/SUCCESS FACTORS

- Green Store certification has been instrumental in supplying green products in market, which in turns stimulates the production of green products.
- Economic incentives offered by the government, including the tax break, were efficient in engaging retail stores.

CHALLENGES/LIMITATIONS

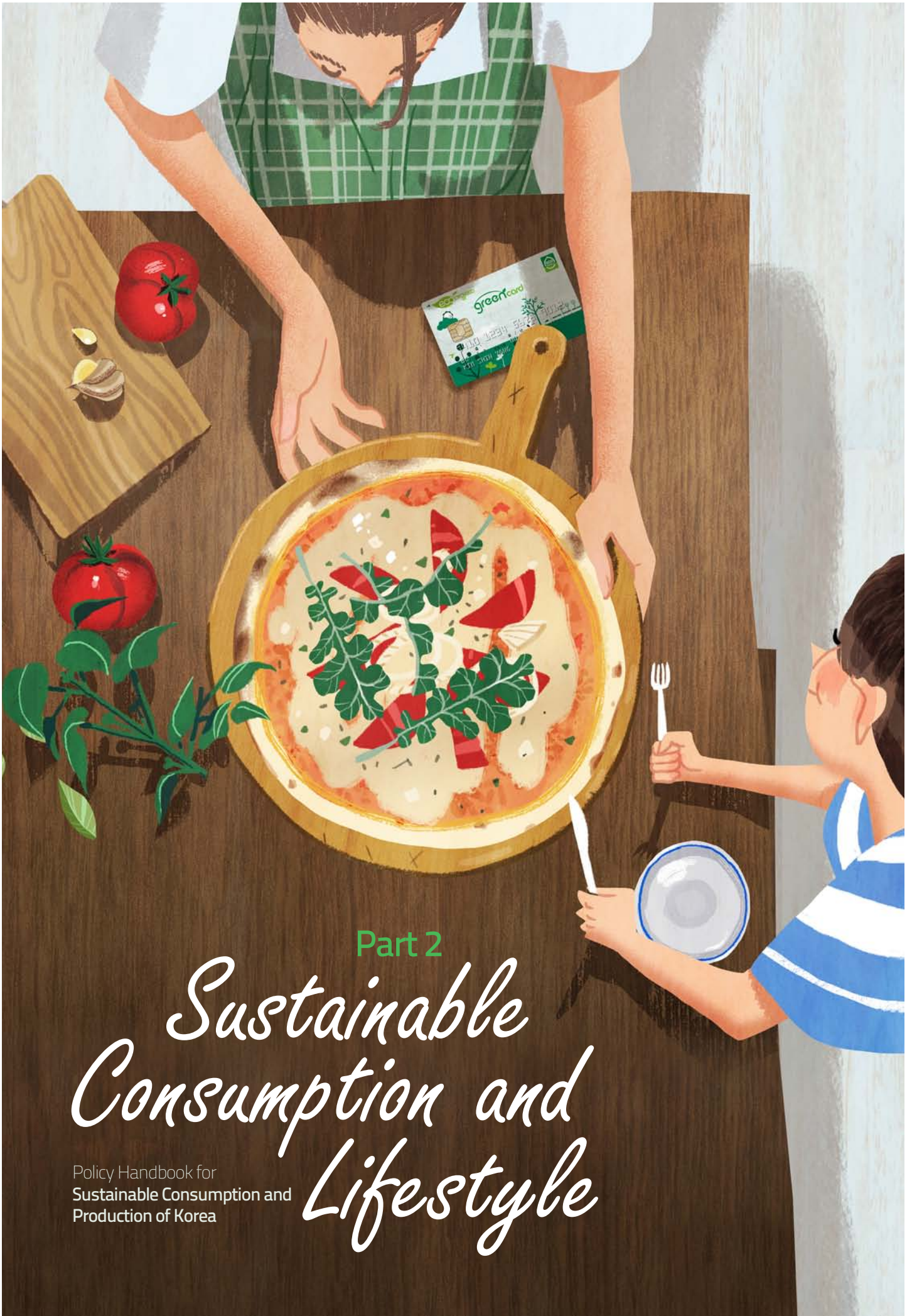
- Small- and medium-sized retail stores face difficulties in applying for green store certification due to their limited manpower and capacity.
- There are limits in widening the certification of green stores because the certification scope is restricted to specific business types, such as large retail stores and specialized organic food stores.

FUTURE PLAN

- It is necessary to certificate a wide range of businesses as green stores, such as neighborhood-oriented small businesses, to create greater access for customers to purchase green products. Green store certification needs to encompass stores specialized for each product category, such as those for electronic appliances, organic products, furniture, and stationery.
- Criteria for the certification of green stores need to be improved to encourage voluntary participation by stores.

REFERENCES

- Eco-friendly consumption blog thinking of the future (http://blog.naver.com/keiti_sns)
- Criteria for the Certification of Green Stores (MoE Notification No. 2013-17)
- Regulation on Operational Process for Green Store Certification



Part 2

Sustainable Consumption and Lifestyle

Policy Handbook for
Sustainable Consumption and
Production of Korea



Green Public Procurement

Green Public Procurement is a process whereby public organizations meet their needs for goods, services, works and utilities in a way that achieves value for money throughout the entire lifecycle in terms of generating benefits not only to the organization, but also to society and the economy, whilst reducing negative impacts on the environment. (Updated by the Multistakeholder Advisory Committee of the 10YFP SPP programme)

Green public procurement in Korea was introduced in tandem with the Korea Eco-label under the Act on Development and Support of Environmental Technology of 1994. The state agencies – i.e. central and local governments and public organizations were recommended to preferentially purchase products awarded the Korea Eco-label or Good Recycled Mark.

The green public procurement took a more concrete form when the government introduced an Act on Promotion of Purchase of Green Products in 2005. The state organizations are obliged by the Act to submit an implementation plan on green purchase of the year and the performance records of the previous year to the Ministry of Environment at the beginning of each year.

The adoption of the Act of 2005 has been instrumental in stimulating public demand on products and services at the early stage of green market development. The total public expenditure in green purchase more than tripled from 254 billion KRW (254 million USD) in 2004 to 787 billion KRW (787 million USD) in 2005. In addition, the number of products certified by the Korea eco-label increased by 3.8 times in 2012 compared to 2004.

Legal Basis

Article 2-2 (Scope of Application); 6 (Public Institutions' Obligation to Purchase Green Products); 14-2 (Establishment and Operation of Data Management System of Green Products); and 17 (Education for Persons, etc. in Charge of Purchase) of the Act on Promotion of Purchase of Green Products

Major Milestones

- 1992: Eco-labeling instituted by the MoE, with the initial selection of four products groups.
- 1994: Encouraged public institutions to preferentially purchase green products through the Development of and Support for Environmental Technology Act.
- July 2005: Public institutions obliged to submit plans and performance reports for the purchase of green products, through the Act on Promotion of Purchase of Green Products
- Since January 2007: Green Product Information Platform (GPIP) established and operated.
- Since December 2013: Public organization is required to designate a green procurement official within the organization.

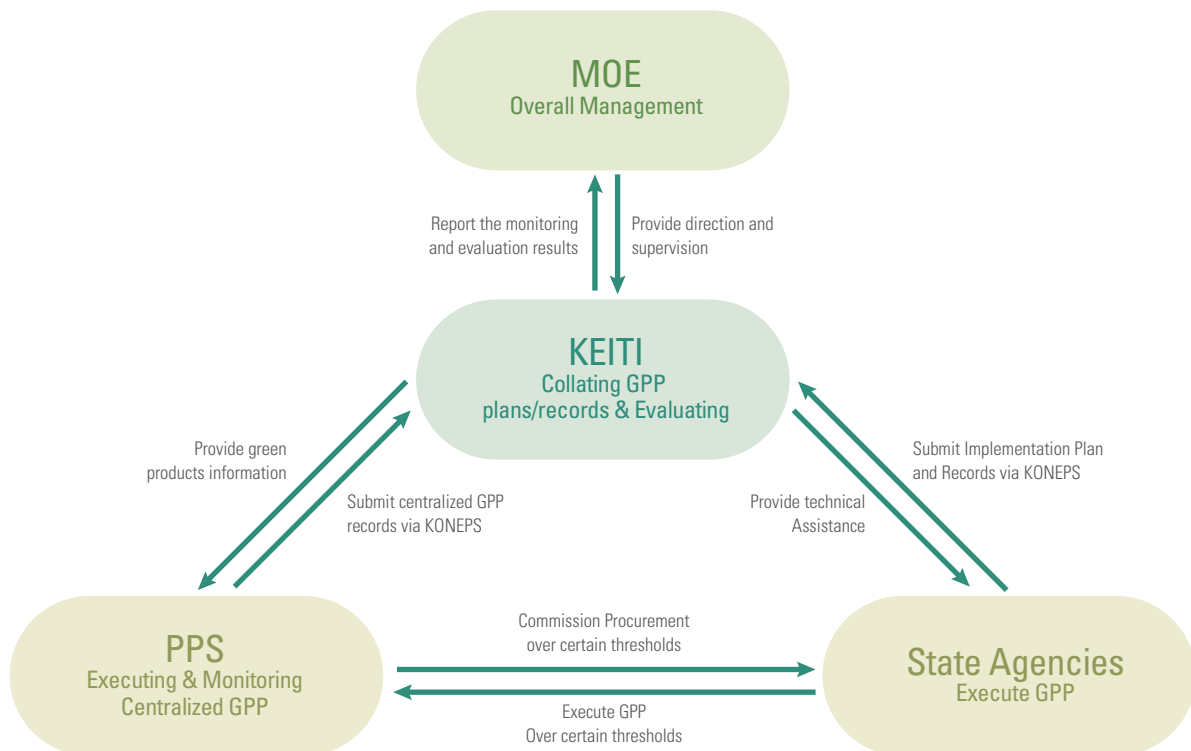
HOW IT WORKS

Working Mechanism of GPP

The GPP in Korea is carried out in partnership with the Ministry of Environment (MoE), Korea Environmental Industry and Technology Institute (KEITI), the Korean Public Procurement Service (PPS) and other public institutions.

- The MoE is responsible for overall management such as establishing law, regulation, and master plans for promoting green product purchases and supervising the actual green purchases of public institutions.
- KEITI lends policy support to encourage the purchase of green products by, for example, operating the Green Product Information Platform, providing education and public outreach on green products for public institutions, monitoring and evaluating GPP records at national level.
- The PPS relays green product information compiled by the KEITI to public institutions, operate online procurement platform to facilitate actual purchase of green products, and provides the KEITI with green procurement records from each public institution.
- Public institutions develops an annual implementation plan with a voluntary target for green procurement, monitor and report green purchase performance records to MOE, and institutionalize green procurement system, for example, by revising municipal ordinances and establishing special contract provisions as a means to favor green products.

Figure 1. Institutional arrangement of the GPP





Box 1. Public Procurement System in Korea

Public procurement in the Republic of Korea is carried out through two different systems – centralized and decentralized – according to the Government Procurement Act. For purchases under certain thresholds, each public authority manages purchases and tendering processes through its own systems. However, for purchases and contracts above these established thresholds, public authorities are required to use the centralized procurement system, i.e. to grant authority to the Korean Public Procurement Service (PPS) to manage the procurement.

Public organizations are required to go through the centralized procurement process if their purchases/contracts are above the following thresholds: a) For single domestic product groups, purchase above 100 million KRW (100,000 USD); b) For foreign products, purchase above 200,000 USD; and c) For construction projects of central governments, over 3 billion KRW (3 million USD), or electric works over 300 million KRW (300,000 USD). The purchase of state agencies and local governments shall be made through the PPS under the conditions of unit price contract (for third parties) or contract with multiple suppliers. Purchases executed by the PPS account for approximately 30% of the total annual Korean public procurement volume, equivalent of 89 billion USD.

In order to conduct all of these large procurement actions, The PPS started digitalizing some of its procurement processes, and in 2002 it established the Korea ON-line E-Procurement System (KONEPS): a secure nation-wide electronic procurement system. KONEPS allows the entire procurement process to be conducted online. This includes activities such as submitting procurement requests, bids, contracting, payments, and consolidates information on national procurement projects. Furthermore, it serves as a “single window” to all procurement activities as it is linked to other public institution’s systems, allowing public and private organizations to find and provide all contract-related documents in the platform. This concentration of information, combined with the integration with the digital budget and accounting system of the Korean Government, makes it easier to monitor purchases.

Scope of Green Products and Services

According to the Act on Promotion of Purchase of Green Products, public institutions purchase green products and services that satisfy certain conditions as follows:

- Certified or meeting the criteria set by the Korea Eco-label; 
- Certified or meeting the criteria of the quality certificate for recycled products (Good Recycled Mark); or 
- In compliance with other environmental criteria set by the MoE in consultation with the heads of relevant ministries.

Table 1. Types of Green Products (as of November 2014)

	Korea Eco-label	Good Recycled Mark
Number of product categories	154 (office supply, electronic appliance, furniture, etc)	15 (recycled paper, rubber, plastic, etc)
Number of certified products	12,793 products manufactured by 2,019 businesses	225 products manufactured by 186 businesses
Certified by	KEITI	GR Institute

Target organizations

State agencies listed below are obliged by the Act to submit an implementation plan for green procurements and performance records on an annual basis:

- Central government
- Local government
- Public corporation
- Public institutes
- Public educational institutes

Submission of Plan and Performance Report for Green Purchases

No quantitative objective is set at the national level. Each institution is required to set a voluntary target for green purchases and submit it with a GPP implementation plan. According to Article 15 (Delegation or Entrustment of Authority) of the Enforcement Decree of the Act on Promotion of Purchase of Green Products, target public institutions are obliged to prepare and submit to KEITI a plan and performance report for green purchases.

The plan and records include both the total purchase amount and the amount of green purchases in the corresponding year. The plan shall be submitted within two months from the start of the fiscal year while the performance report shall be compiled and submitted to KEITI within three months from the end of the fiscal year. The submitted plan is made public on the website of each institution after approval from KEITI. The institution shall then report to KEITI if it has published the plan.

If the green purchase record has increased from the previous year by 50 percent or more or decreased by 30 percent or more, data to ascertain the grounds for the change shall be submitted to KEITI under Article 9 (Purchase Records of Green Products) of the Act on Promotion of Purchase of Green Products. The green purchase records of public institutions verified by this process are made available to the public via the website of the Ministry of Environment.



Purchase Procedures

Public procurement is carried out through two different purchase methods: direct and indirect purchase. Direct purchase refers to purchases made by a relevant department using its organizational budget, as is the case with government supply materials. Indirect purchase refers to an agreement made by an organization with a third-party business such as a service provider, which executes the necessary purchases as a contractor using the budget of the contractee organization.

Most direct purchases are made online. Online purchase of green products is carried out either at the Korea On-line E-Procurement System (KONEPS) or at the Green Market. Operated by the government, the KONEPS is an advanced electronic procurement system that conducts the entire public procurement process online operated by the PPS. It posts the tender information of all public institutions and serves as a unified portal to all public procurement, in which a one-time registration is the sole requirement to participate in bidding towards any institution. This standalone procurement system posts various pieces of information on product profiles including green product certification such as Eco-label and Good Recycled mark, which provides greater convenience for procurement officials in public institutions to purchase green products.

Operated by KEITI through a service contract, the Green Market system only registers green products with the Eco-label and GR mark, which allows greater convenience to purchase green products than through the KONEPS. When purchases are made through the two systems above, the purchase records of each public institution are automatically linked to the Green Product Information Platform (GPIP) for data aggregation.

Direct Purchase

- Firstly, verify whether there are any green products among products intended for purchase, which can be queried through the GPIP (<http://www.greenproduct.go.kr>) or the Resources Circulation Industry Promotion Association (<http://www.gr.or.kr>). The GPIP provides a monthly list of products with Eco-label and GR mark and also provides a product search function.
- If there is a green product in the purchase list, verify whether the relevant green product can be purchased, based on considerations of price, function, size, and transportability.
- Purchase the product selected through final confirmation, utilizing information included in the GPIP such as retailer information.

Indirect Purchase

- Indirect purchase is made by a third-party company with the budget of a public institution through service contracts or entrusted projects. In this case, information on green products and items subject to green product classification determine whether a specific green product can be purchased through a contract. As is case with direct purchases, the possibility to purchase a green product can be checked through the Green Product Information Platform (<http://www.greenproduct.go.kr>) or the Resources Circulation Industry Promotion Association (<http://www.gr.or.kr>).

- In cases of indirect purchase, public institutions should require the contractor to purchase the green products. For example, the preferential use of green products is specified in contract-related guidelines such as service conditions, special conditions or specifications.
- If possible, the contractor should purchase the green product in line with information on the GPIP (<http://www.greenproduct.go.kr>) or the Resources Circulation Industry Promotion Association (<http://www.gr.or.kr>). At the relevant public institution, the official responsible for the contract shall monitor whether the contractor is actually purchasing and using green products.
- Upon fulfilling the contract, the contractor prepares and submits to the relevant public institution the list of green products purchased. These records shall be collected by the official in charge of green purchases in each institution and submitted to KEITI within three months from the end of each fiscal year.

Box 2. Exception clause for purchase of green products

- When no green products are available for the item intended to be purchased;
- When the green products cannot be supplied in a stable manner;
- When it is difficult to achieve the objectives of purchasing products, due to grounds, such as substantially deteriorated quality of green products;
- When the heads of public institutions intend to purchase products, other than green products, in order to comply with provisions of preferential purchase under other Acts, such as the Act on Welfare of Persons with Disabilities, etc.;
- When the heads of public institutions conclude that it is difficult to purchase green products, due to unavoidable reasons, such as urgent demand, etc.

Monitoring and Evaluating System

In order to monitor progress in the implementation of green procurement, the MoE monitors two aspects:

- Operations-related aspects, namely, the number of public authorities developing GPP Implementation Plans and reporting on its implementation.
- The level of actual purchase of green products and services.

With the information gathered on the level of purchase of green products, KEITI also calculates:

- The sustainability impacts of the GPP based on the level of purchased green products.



Monitoring the deployment of Green Implementation Plans

This is monitored based on the number of public entities that submit their annual GPP plans to the MoE by uploading them in GPIIP. It is evaluated according to the total number that should submit it

The total amount of plans and records cover more than 30.000 public organizations in the country; however they are not collected individually. Umbrella organizations and regional governments are in charge of compiling the records of the subsidiary organizations and cities within their boundaries. Therefore in total about 870 documents are compiled covering the whole Korean public sector.

Monitoring the level of green products purchased

To track progress, the indicators calculated by KEITI are:

- The total amount of green purchases measured in both units and economic value for product groups with eco-label criteria (both Korea Eco-label and Good Recycled Mark), and
- Since 2010, the percentage of green purchases from a list of 33 product groups¹⁷ in relation to the total expenditure in those product groups (from 2013 the percentage of the GPP is expected to be calculated for all the green product groups).

The PPS also discloses information on the GPP conducted through the platform in terms of:

- Percentage of the GPP over the total purchases by PPS.

In order to facilitate the GPP implementation and data reporting, KEITI set up in 2005 the Green Products Information Platform (GPIP, www.greenproduct.go.kr). The GPIP website serves as the main source of information for GPP in Korea and provides access to resources, such as the GPP guidelines, a list/catalogue of certified products, a compilation of best GPP practices by Korean public authorities, and the application to compile the GPP reporting data.

Given the two levels of procurement activities, those conducted by organizations individually and those conducted in their behalf by the PPS through KONEPS, the monitoring system has been designed to integrate both results:

- GPIP tracks the records of green purchases conducted through KONEPS. As both systems are electronic applications, GPIS is directly connected to KONEPS and automatically calculates the data on green products purchased by PPS so that authorities do not have to report on that.
- For purchases conducted by authorities independently, i.e. outside KONEPS and the PPS, the GPIP provides an online form that allows public organizations to manually enter procurement information.¹⁸ The fields to be reported are: 1) Expenditure in each of product groups and 2) The number of units purchased.

Revision of the Act on Promotion of Purchase of Green Products has stipulated that each public institution shall designate an official in charge of green procurement from April 2014 onwards, in order to prevent the loss of records with regards to purchases made outside of the PPS without being linked to the system.

Evaluating the sustainability impacts of green purchases

To communicate the benefits of the GPP and promote its further implementation, KEITI calculates the potential to reduce environmental impacts and the economic and social benefits of buying green.

To measure environmental impacts KEITI estimates the reduction of CO₂ equivalent emissions achieved from buying products certified or compliant with the Korea Eco-label. Calculations are made by comparing impact reduction for proxy eco-labeled products with conventional products.

The estimation of CO₂ equivalent reductions is conducted for 19 eco-labeled product groups including electronic goods, construction materials, office furniture, and papers, for which life-cycle assessment data was produced in order to estimate the GPP's environmental and economic impacts.

The economic benefits, are calculated based on the estimated economic savings resulting from the reduction of CO₂ emission previously obtained.

Social benefits are expressed in terms of jobs created based on a figure - the employment inducement coefficient (8.3 persons per billion won, year of 2010), provided by the Bank of Korea. This indicator is used to demonstrate the relationship between expenditures on green public procurement over time with number of jobs created.

Publication of results

Once all data has been compiled by KEITI through the GPIIP, green purchases records from each public authority individually are made available to the public by the MoE and KEITI. These are disclosed at the MoE website and at the GPIIP, where the public can easily access and compare results. In addition, case studies featuring good practices are annually published by KEITI.

Economic and Human Resources

The initial set-up costs of the GPIIP in 2005 were approximately the equivalent of 720,000 USD. Since then, the equivalent of about 180,000 USD has been allocated annually for the management of the system.

KEITI has two researchers in charge of the GPP that are responsible for the collection of the Purchasing Plans and the monitoring and evaluation of results, together with other tasks including conducting training on the GPP, developing guidelines for the GPP, and collecting and disseminating best practices via workshop, newsletter, and publications.

In addition, currently three staffs are allocated at the Customer Service Center in order to respond to queries and provide information with public procurers on the list of green products, purchase procedure on green products, monitoring process, and usage of the GPIIP, etc.



IMPLEMENTING STRATEGY

Supporting Green Products to be Registered as Vendor Products of the PPS

Administrative support has been offered in order for eco-labeled products to be registered in the PPS in order to facilitate the distribution of green products. In addition, detailed information including the price, size and images of newly-certified products are updated at the GPIP on a regular basis to allow greater convenience for procurement staff to search for green products.

Providing Fiscal Incentives

The level of green procurement is reflected as one of the indicators to evaluate the annual performance of public institutions and local governments, thereby affecting the annual performance bonus received by public organizations at the end of each fiscal year. The weighting factor of the GPP varies according to the type of organizations as follows: 5.7/900 points for local governments; 0.2-0.4/100 points for public enterprises and quasi-government institutions; and 1.5/100 points for local corporations.

Based on the annual GPP records, KEITI evaluates each organization, taking into account: 1) the percentage of green purchases in relation to the total amount of annual purchases. This approach avoids discriminating against small and medium organizations; and 2) the efforts made by each institution to improve the GPP system.

Sharing and Disseminating Best Practices

The KEITI annually holds workshops in order to exchange good practices, as well as to discuss with procurers on how to improve the GPP system. The workshops are held for three different targets: local governments (244 institutions), public enterprises and quasi-government institutions (117 institutions) and the Republic of Korea Army.

During the workshop, presentation contests for best practices are held, where the best performing institutions and relevant officials are awarded with commendations, monetary prizes and overseas training opportunities.



Outstanding practices for the GPP are collected and distributed in the form of a best practice compendium and quarterly newsletter.

Providing Training and Guidelines

The KEITI produces the guidelines for the GPP in October every year and upload it on the GPIP (<http://gd.greenproduct.go.kr>) to make it available online for procurers.

A nationwide training is offered to over 6,000 public officials in public institutions from November to December every year, in consideration of the biannual changes of responsible officials under the public official system in Korea. The guidelines and leaflets for green public procurement are distributed in advance.

Furthermore, on-demand training is provided during the year for those institutions which are not participated in the circuit training or request for an in-house intensive consultation. Each institution is provided with tailored training by analyzing the purchase records of the relevant institution and reflecting suggestions for improvement.

Table 2. GPP Training and Workshop Records

Year	Nation-wide Circuit Training		Training on Demand		Workshops		Total	
	Times	No of Attendee	Times	No of Attendee	Times	No of Attendee	Times	No of Attendee
'05	9	1,830	4	500	7	650	20	3,030
'06	11	3,210	14	1,065	3	850	28	5,125
'07	11	4,140	21	1,845	3	583	32	5,985
'08	11	3,620	30	1,959	3	482	44	6,061
'09	12	4,176	33	2,234	3	450	48	6,860
'10	17	4,475	44	3,435	4	906	65	8,816
'11	21	5,603	39	3,057	4	931	64	9,591
'12	20	4,961	42	2,624	4	710	66	8,295
'13	23	6,339	45	5,221	4	1,400	72	12,960

In addition, KEITI establishes the Standard Ordinance for Promotion of Green Procurement and distributes it to local governments and education authorities in order to assist municipal and provincial governments in establishing



local-level ordinance for encouraging the purchase of green products. The Standard Ordinance for Promotion of Green Procurement for local governments was established and distributed in April 2006. At present, a total of 242 out of 244 local governments have established their own ordinance for GPP, recording an ordinance establishment ratio of 99.2 percent. The Standard Ordinance for Promotion of Green Procurement for education authorities was established and distributed in July 2013.



MAJOR OUTCOMES

Since 2005, KEITI has collected and published the GPP results from Korea's public sector. In 2013, all the agencies subject to the GPP submitted green procurement plan and performance. The total amount of green procurement by all public institutions reached 2.431 trillion won in 2013, which has grown 2.6 times since 2005.

In particular, the procurement of green construction materials increased by 330.9 billion won in 2013 from the previous year due to efforts made since 2010 to encourage green procurement from the design stage by reflecting green construction materials in specifications; offering training to architects; and publishing and distributing catalogs of green construction materials. The top five items in terms of increased procurement in 2013 included windows and doors, asphalt concrete, civil engineering construction materials, lighting products, and precast pavers.

Table 3. Trends in GPP in Korea and its Impacts

	2005	2006	2007	2008	2009	2010	2011	2012	2013	Total
Total expenditure on green products (billion KRW/ million USD)	787	861.6	1,343.7	1,584	1,629.6	1,641.2	1,645.5	1,727	2,043.1	13,262.7
% of GPP over the total (domestic) purchases executed by PPS	4.5	5.3	6.9	5.4	5.3	4.9	5.3	6.1	7.5	-
Reduction of CO ₂ equivalent emission from the shorter list of green products (in thousands of tons)	108	316	495	601	620	538	544	491	532	4,245
Economic benefits linked to CO ₂ emissions reductions (billion KRW/ million USD)	53.5	58.6	91.4	107.7	110.8	111.6	111.9	117.4	138.9	901.9
Job creation (individuals)	6,532	619	4,001	1,995	379	96	36	677	2,624	16,961

Figure 2. Trends in GPP Records and Ratio

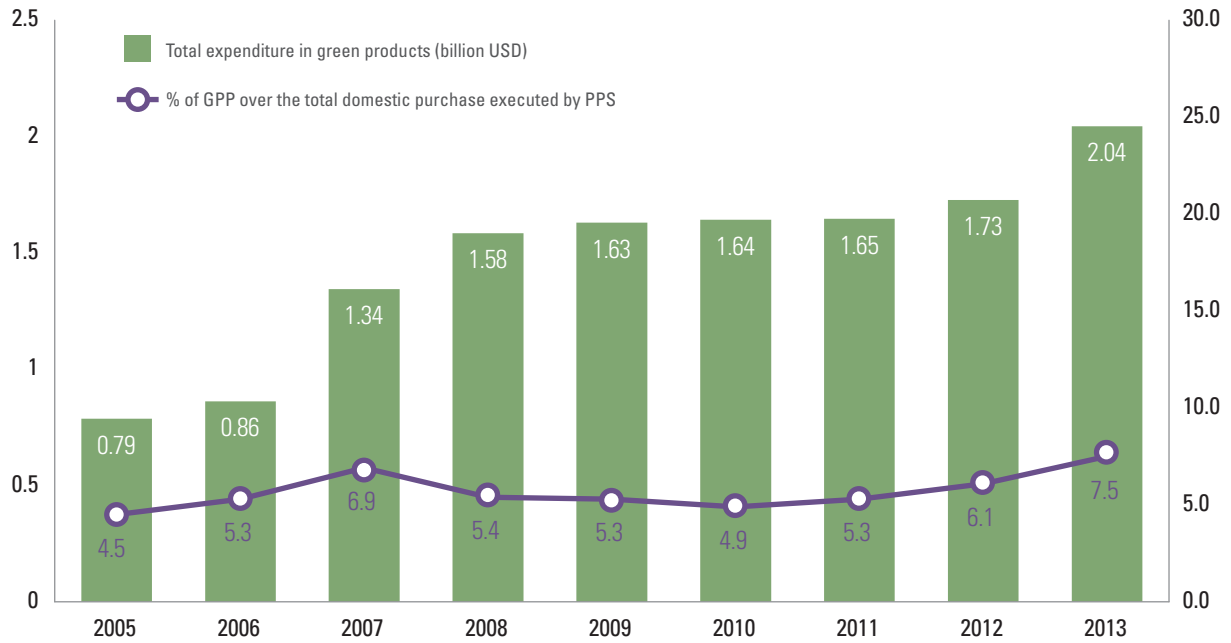
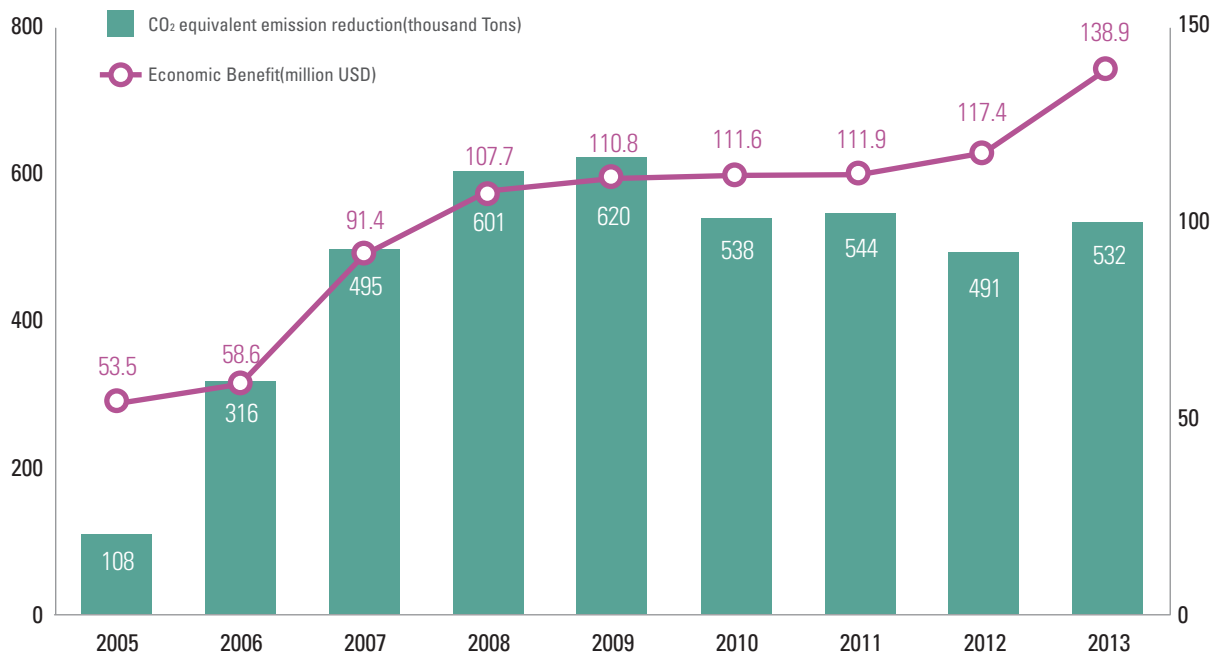


Figure 3. Trends in GPP Impacts





STRENGTH/SUCCESS FACTORS

- The prior existence of a well-established e-procurement system (KONEPS) and the centralization of a large number of procurement processes through the central procurement agency (PPS), concentrating a large volume of the GPP data in one single source.
- The institutional arrangement between key stakeholders such as the PPS, the MoE and KEITI to develop an integrated e-monitoring system, which gathers the GPP data from the existing systems, making the monitoring more efficient and less burdensome for the procurement staff in each organization.
- The annual publication by the MoE of the GPP guidelines, which not only provide technical assistance to procurers on the GPP implementation but also on reporting processes.
- The provision of intensive training to assist procurement staff to develop plans, compile data, and report results.
- The public recognition of organizations' good practices in implementing and monitoring the GPP through their prizing by the MoE and its dissemination via the media.
- The use of green procurement records as one of the criteria to evaluate the annual performance of public institutions, which affects the bonus that each institution receives at the end of each fiscal year, which also affects their reputation.

CHALLENGES/LIMITATIONS

- There are no concrete environmental, social, and economic goals set for the GPP at national level.
- The procurement carried out based on contracts, such as construction and maintenance, repair and operations, is not properly monitored.
- The scope and number of green products should be expanded to cater the requirement of various institutions. In particular, as for product categories that require diverse functionality, such as construction materials and ICT devices, a variety of green products with diverse functions and designs should be developed in accordance with the demands of public procurers.
- Due to frequent changes of public procurers at public institutions, training and public outreach on the GPP are continuously required.

FUTURE PLAN

- Strategically expand the scope of eco-labeled products by analyzing product groups among the goods in high demand by the PPS
- Improve the GPP monitoring system by linking accounting system of each public institution to the Green Procurement Information Platform.
- Designate green procurement officials in each public institution, and offer them more intensive and extensive specialized training.
- Provide networking opportunities between manufacturers and procurers in order to facilitate understanding on the needs of procurers as well as green products
- Improve methodologies to evaluate sustainability impacts of the GPP and communicate the benefits of GPP to public
- Develop and expand incentives for outstanding green procurement agencies and staff

REFERENCES

- Green Products Information Platform: <http://gd.greenproducts.go.kr>
- Korea ON-line E-Procurement System: <http://www.g2b.go.kr>
- Green Market: <http://shop.greenproduct.go.kr>
- SEAD, The SED Guide for Monitoring and Evaluating Green Public Procurement Programs, (Ecoinstitut, 2013)
- OECD, compendium of GPP best practices: <http://www.oecd.org/gov/ethics/best-practices-for-green-procurement.htm> (Accessed Dec 4 2014.)



Box 1. GPP best practices

[CASE 1] Establish and revise internal regulations, including in-house procurement guidelines and regulations on contractual operations, to establish the basis for the preferential procurement of green products. In case of non-purchases, an appropriate reason must be submitted.

Regulations on Contractual Operations

Amended on Aug. 21, 2013

Chapter 1 General Provisions

Article 8 (Submission of Documents Requesting Contract)

⑦ The head of a department in charge of contract requests or purchase orders shall state in standards, specifications and a proposal request when requesting procurement or contract that products promoted for public procurement shall be preferentially used, such as goods produced by severely disabled people, green products, SMEs (including women’s businesses and products produced using new technologies), persons of national merit, or social enterprises. In case products promoted for public procurement are not purchased, the department head shall submit grounds for the non-purchase. <Newly inserted on Aug. 21, 2013>

Statement of Reasons for Non-purchase of Green Products

Department/Team:

Contract Date	Item	Classification No.	ID No.	Quantity	Amount	Reasons

[CASE 2] Add special provisions for green products in a tender notice, task instructions and specifications to lay the ground for the preferential procurement of green products from the stages of construction, service, and procurement order.

State the procurement of green products (Korea eco-labeled or GR-certified products) in procurement standards and specifications of equipment and materials for maintenance

8.3.1 Preferentially purchase or require contractors to use eco-labeled products as defined by Article 17 (1) of the Development of and Support for Environmental Technology Act or GR-certified products prescribed and publicly notified by the Minister of Knowledge Economy pursuant to Article 33 of the Act on the Promotion of Saving and Recycling of Resources.

* Applied only in the availability of green products.

* Green products are only recognized as such in the presence of one of the below labels.

[CASE 3] Reflect green procurement records in internal performance evaluation by monitoring green procurement records of each department and responsible staff, and grant incentives accordingly to encourage green procurement.

Include green procurement records in internal performance evaluation and grant incentives based on the records of green procurement

Classification	Classification	Weighting Factor (%)	Converted Score
Quantitative KPI	Implementation rate of state-recommended procurement policies	20	
	Products manufactured by SMEs, social enterprise, products using new technologies, green products, products by women's companies, severely disabled people or veteran rehabilitation centers, and purchase amount using Onnuri *gift cards		
	Electronic procurement ratio		
Quantitative KPI	Accounting and settlement	25	
	Establishing electronic contract system	5	
	Accuracy of tax return and payment	11	
	Implementing fair bidding	11	
	Asset management through systems	8	
	(shared) Average annual number of hours for training per capita	3	
	(shared) Budget execution ratio	3	
	(shared) Degree of cooperation within an organization	4	
	Total Weighing Factor	100	

* Onnuri gift card is a voucher that can be used instead of cash at traditional markets only.



[CASE 4] Establish and operate an internal procurement and accounting system which allows efficient and convenient monitoring of green products purchase

Purchase request information							Storage		
Purchase request document	Management Innovation Office-2743	Purchase request information	Purchase request dept.	Management Innovation Office	Staff responsible for purchase request	Choi Jae-wan			
Purchase request title	Plan (proposal) to purchase computer consumables (printer toner) for business use				Budget allocation		0		
Item decision descriptions									
Item decision no.	20131024	Contract category	Purchase		Attached files			+ Add	🗑 Delete
Item decision title									
Decision classification	Purchase	Customer						🔍	
Order date	2013-10-24	Requested delivery date	2013-10-24						
Budget classification								🔍	
Remark									
Reviewer		Procurement method	<input checked="" type="radio"/> Self procurement <input type="radio"/> Central procurement						
Item details							Add line	Delete line	
No.	Item name	Specifications	Item classification	Item classification (detailed)	Quantity	Unit	Unit price	Amount	
1	Recycled toner	HP Q5949X	Eco-friendliness						
2	Recycled toner	HP P2055	Eco-friendliness						

[CASE 5] Promote the distribution of green products through a variety of procurement policies, including the conclusion of a memorandum of understanding (MOU) to stimulate procurement among agencies potentially purchasing green products.

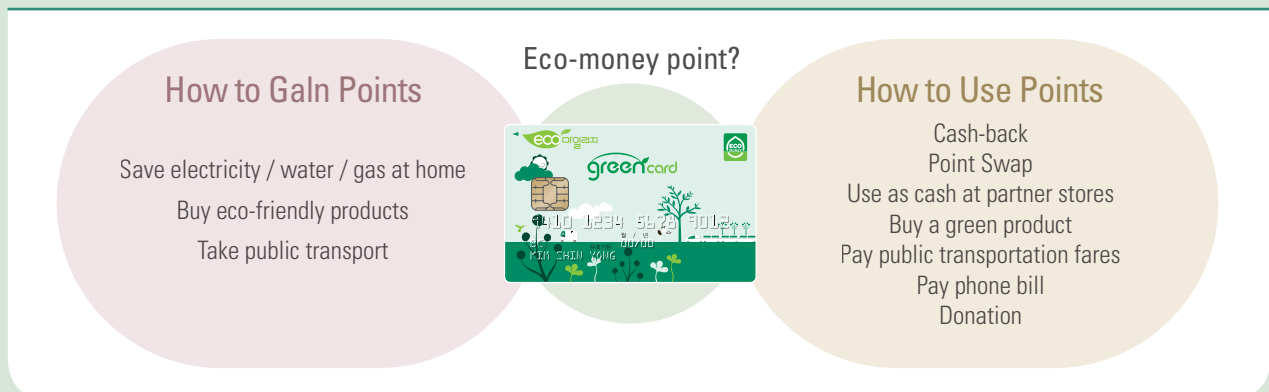
Green Credit Card

Green Credit Card is an economic incentive scheme that provides economic rewards to credit card users for i) purchasing low-carbon and eco-friendly products, ii) using public transport; and iii) saving utility rates including electricity, water, and gas.



Economic rewards, called eco-money points, are accumulated on credit card system and can be redeemable for cash or used for various purposes. The Green Credit Card aims to promote sustainable lifestyles and shape eco-friendly consumption patterns by offering tangible economic incentives to eco-friendly consumers.

Figure 1. Overview of Green Credit Card



Legal Basis

- Article 15 (Support, etc. for Encouragement of Purchase of Green Products) of the Act on Promotion of Purchase of Green Products
- Regulation on the Operation of Carbon Point System (MoE Notification No. 2010-25, March 2010)

Major Milestones

- January 2011: Launched Seoul City Eco-mileage Card (predecessor to Green Credit Card)
- March 2011: Established Green Credit Card Master Plan and Action Plan
- April 18, 2011: Designated BCard as system manager, and nine banks and credit card companies as issuer of the Green Credit Card
- 2012: Conducted a 3rd-phase project for convenience stores.



HOW IT WORKS

Working Mechanism of Green Credit Card

The MoE carries out overall management and supervision on the Green Credit Card system including the development of eco-friendly public services and expansion of the membership of the card.

KEITI operates the green credit card system by managing the card issuers, engaging other key stakeholders in the system, and developing and promoting various incentives for the green credit card users.

Bccard serves as the system manager to establish and maintain an integrated digital system to allow the issuance of the green credit card and eco-money points as well as monitor the usage data, engage retailers and manufactures to participate in the card system, and conducts marketing and public outreach activities.

Fourteen financial institutions affiliated with Bccard and KB Card issue the credit card, award eco-money points and conduct marketing and public outreach activities.

Retailers distribute eco-friendly products in stores, award eco-money points for the purchase of eco-friendly products, establish the Green point-of-sales (POS) system, and conduct the Green Consumption Week campaign.

Advisory committee consists of representatives of the MoE, system manager, issuers, participating companies, academic circles, and civic groups, with the aim to deliberate and determine matters concerning the operation of the green card system, including the point system, eco-friendly products and services covered under the system, and fund management.

Figure 2. Working Mechanism of the Green Credit Card



Eco-money Point System

First, economic incentives are given for the purchase of eco-friendly products with the budget of manufacturers and KEITI. When an eco-friendly product is purchased at a store equipped with Green point-of-sales (POS) system, 2 percent of the product price is offered by KEITI as eco-money points. Eco-friendly products eligible for eco-money points are the ones certified by the Korea eco-label, carbon footprint label, or eco-friendly agricultural certification.

In case the products are affiliated with the Green Credit Card, 1 to 5 percent of the product price is provided by manufacturers, while additional 4 percent points are given by KEITI.

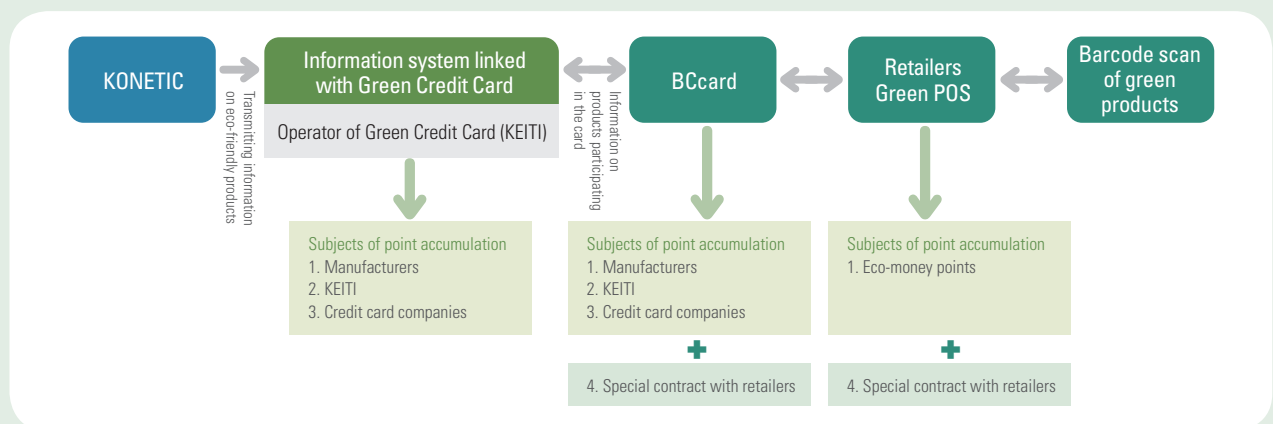
Among the products affiliated with the Green Credit Card, additional points are provided with low-carbon certified products for 2 percent, products manufactured by SMEs for 3 percent, products sold at Nadeulgage for 5 percent, and point accumulation labeled products for 5 percent of the product price.

A total of 1,158 products certified by the Korea eco-label, the carbon footprint label, or the eco-friendly agriculture label are eligible for eco-money points up to 24 percent of the product price.

Box 1. Green POS system

Green point of sale (POS) is an integral part of the Green Credit Card scheme. It enables retail stores to automatically recognize green products via barcode scanner, and award eco-money points to consumers when purchase of green products is made with the Green Credit Card. Green POS in Korea builds on online database on green products, managed by KEITI, which provides information on green products.

In accordance with the agreement on operation agency of Green Credit Card in July 2011, operating agency (BCcard) invested 2 billion KRW (2 million USD) in setting up Green POS at retail stores. As of December 2014, Green POS system was installed at 31,000 stores of 21 retailers.





Second, the card system management agency, currently BCard, awards points for the use of public transportation. Up to 20 percent of transportation expenses are accumulated as points for the use of the bus or subway network. Eco-money points equivalent to 5 percent of transportation expenses are accumulated for the use of KTX - bullet train or express bus.

Table 1. Eco-money Point System for Public Transport Uses

Total purchase amounts by credit card in the previous month	From 200,000 won or more to less than 1 million won	1 million won or more
Accumulation rate	10% (bus, subway) 5% (express bus and train)	20% (bus, subway) 5% (express bus and train)
Limit	5,000 points	10,000 points

Third, points are accumulated as rewards for saving utilities such as electricity, water or gas at home. The cardholder need to register online and input the customer number specified on the utility invoice. Then points accumulated for saving unities are converted into and offered as eco-money points with the funding of the MoE and municipalities. The eco-money points are calculated based on the date of the GHG emission reduction during the period of past six months compared to the average GHG emissions for the previous two years.

Table 2. Eco-money Point System for Saving Utilities at Home

	When the emissions drop by more than 5%, but less than 10 %	When the emissions drop by 10 % or more
Electricity	20,000 points	40,000 points
Water	5,000 points	10,000 points
City gas	10,000 points	20,000 points
Total	35,000 points	70,000 points

The cardholders are allowed to use the public facilities such as national parks and museums free of charge or at a discount price. The operating costs required to run the facilities are offset by the subsidies given by the MoE. As a result, a total of 746 public facilities run by 17 local governments, such as national parks and recreational forests, participate in the card system as of December 2013.

Figure 3. Discounted Entry Ticket to Tourist Attraction for Green Credit Card Users



Identification and Engagement of Partner Organizations

A company or institution which intends to participate in the Green Credit Card system submits a statement of intent for participation to the operating institution. The head of the operating institution who receives the statement of intent evaluates its eligibility and concludes a partnership agreement on eco-money point.

Companies or institutions eligible for participation are as follows :

- A company or institution which produces or sells products certified as green products, carbon footprint labeled products, or low carbon products
- A company or institution that provide eco-money points
- A company or institution that produces or sells products with a refill mark.
- Central government, local governments, and public institutions
- Other companies or institutions recognized by the MoE or the head of the operating institution as necessary to achieve the purpose of the card system.

Operating institutions periodically come up with a list of potential partner manufacturers and retailers to be engaged in the green credit card. The internal assessment is undertaken, taking into account the followings:

- For manufacturers, whether their products are being sold at large stores along with their sales revenues and brand awareness among consumers
- For retailers, whether they are ranked at a higher level of the industry along with the number of operating stores.

Once the potential partner companies are identified, they are approached by the operating agency and system manager to conduct a working-level discussion to encourage participation in the Green Credit Card system.

Figure 4. Work Flow of Engaging Partner Companies

Stage	Required Period	Descriptions
Listing up potential partner companies	On a regular basis	<ul style="list-style-type: none"> • Retailers are selected based on ranking in the industry, the number of stores, etc. • Manufacturers are selected based on whether its products are certified as green products • Service providers which can contribute to facilitating green lifestyles
▼		
Selecting partner companies	1 week	<ul style="list-style-type: none"> • Partner companies are evaluated and selected based on availability at supermarkets, sales revenues of companies and products, and brand awareness among consumers
▼		
Working-level discussion	2-3 months	<ul style="list-style-type: none"> • Distributing Green Credit Card leaflets and visiting companies
▼		
Executive meeting	As necessary	<ul style="list-style-type: none"> • Formulating industry-tailored support measures in order to reflect opinions from the companies
▼		
Submitting statement of intent for participation and signing a contract	2 weeks	<ul style="list-style-type: none"> • Concluding the partnership agreement among three parties— KEITI, participating companies, and BCard * Holding a signing ceremony with companies participating in the card scheme
▼		
Affiliated marketing and account settlement	1 year after agreement	<ul style="list-style-type: none"> • Conducting collaborative marketing for the card • Offering green customer relationship management (CRM) and establishing customer-tailored marketing strategies • Settling accounts for eco-money points on a monthly basis

Settlement of Eco-money Points among Stakeholders

Eco-money points are calculated and converted into points redeemable by the cardholders on a monthly basis.

- BCard provides participating companies or institutions, including manufacturers, retailers, service providers, public institutions, and local governments, with the settlement data for credit card points accumulated in the previous month.
- Settlements are conducted after participating organizations and the operating agency cross-examine the settlement data.
- Partner organizations remit expenses to KEITI or the system manager depending on methods of processing accumulated points via either expenses or donation.

Figure 5. Flowchart for the Settlement of Accumulated Points

Due Date	Procedure	Descriptions
10th of the following month	Sending settlement data to each participating organization	<ul style="list-style-type: none"> • BCard sends data to participating organizations and KEITI * Transaction data from the 1st to last day of the previous month • Final check of settlement data for each company
▼		
15th of the following month	Charging points and fees	<ul style="list-style-type: none"> • BCard charges points to each participating organization
▼		
18th of the following month	Processing points and donations as expenses	<ul style="list-style-type: none"> • Each participating company issues receipt to BCard • In case points are disbursed as donation, each participating organization sends expenses to KEITI
▼		
22nd of the following month	Making customers' accumulated points usable	<ul style="list-style-type: none"> • Participating companies award points to customers in usable format

Economic and Human Resources

Ten persons are allocated within the operator (KEITI) of the Green Credit Card system as follows: Operation and overall management (1 person), partnerships and marketing (2 persons), system operation (2 persons), eco-money point settlement (1 person), management of international affairs (2 persons), and public outreach (1 person).

Budget: A total of 1.2 billion won (as of 2013)

Project Name	Budget Allocation (Unit: %)
Promotion of the Green Credit Card system	40%
Establishing corporate partnership and cooperative networks	30%
Conducting research on the promotion of eco-friendly consumer lifestyles	20%
Managing operating agencies of Green Credit Card	10%
Total	100%

IMPLEMENTING STRATEGY

Raising awareness on Green Credit Card as a means to practice eco-friendly lifestyles

- Broadcast TV programs to publicize eco-friendly consumer lifestyles.
- Publish feature articles on eco-friendly consumption festivals and the Green Credit Card.
- Operate online blogs and SNSs on eco-friendly consumption.
- Disseminate cartoons for promotion of eco-friendly lifestyles in leaflets and local government websites
- Carry out spot campaigns for eco-friendly traditional holidays.
- Run video adverts of Green Credit Card on subway destination indicators and screen doors and public buses.
- Operate Green Card booths at various environmental events including ECO-EXPO KOREA.



Developing and expanding incentives tailored to the different consumer group.

- Conduct Idea Contest to gather innovative ideas to improve green credit card scheme
- Expand the scope and the number of products that offer eco-money points, such as eco-label products, organic products, and eco-friendly services.
- Develop various types of credit cards that consider customer lifestyles.

Strengthening and expanding the network of the key stakeholders

- Develop incentives to engage the eco-manufacturers, retailers, and finance institution.
- Establish the nation-wide Green POS system in partnership with retailers.
- Provide incentives with municipalities in developing eco-friendly public services for the Green Credit Card users.



MAJOR OUTCOMES

As of December 2014, 17 financial institutions, 144 companies including manufactures and retailers, and 1,431 products were affiliated with the Green Credit Card platform.

Increase in the Sales of Eco-friendly Products

The sales of eco-friendly products paid with the Green Credit Card increased by an average of 54.8 percent from July 2011 to June 2013. The price competitiveness of eco-friendly products increased as a result of the expanded accumulation of eco-money points from 1.9 percent in 2011 to 9.5 percent in 2012 and to 31.5 percent in 2014. When payment is made with the Green Credit Card, 10.3 percent of the total payment amount is accumulated as eco-money points. Therefore, even if eco-friendly products are 10 percent more expensive than general products, the price gap is reduced by using the card for the purchase.

Use of Green Credit Card for Public Transportation

The Green Credit Card has high utility for public transportation expenses. Public transportation expenses paid with the Green Credit Card totaled 2.5 million USD from 2011 to 2014. Green Credit Card outperformed ordinary cards in terms of the average monthly usage frequency for public transportation expenses.



Use of Green Credit Card for Public Facilities

Local governments have increased the number of public facilities available with the card from 381 in 2012 to 746 facilities, up 95 percent. A number of popular facilities across the nation (e.g., Suncheon Bay Ecological Park and Seongsan Ilchulbong Peak) have participated in the card scheme, thereby increasing benefits for consumers.

GHG Emission Equivalent Reduction

Positive environmental effects are induced from the reduction in the household use of electricity, water, and gas, which can be equated to economic savings of 6 million USD from July 2011 to December 2014. The environmental improvement effects generated from the use of one Green Credit Card reaches a monthly average of 50 USD per card.



STRENGTH/SUCCESS FACTORS

Market-based instrument operated in collaboration with private sector

- The Green Credit Card makes economic sense by converting a small fraction of the profits generated from the sales of eco-products to eco-money points. Therefore, it is financially viable and does not require substantial funding from the government.
- A variety of stakeholders including consumers, retailers, manufacturers, and credit card companies can benefit from the Green Credit Card.

Credit card platform serves as a convenient medium to accumulate and use eco-money points in daily life

The Green Credit Card system has attracted more than 9 million users, contributing to a change in consumer awareness and behavior. A survey, conducted for 2,000 people in 2013, showed that 64.5 percent of cardholders put efforts to purchase energy-saving products compared to 56.1 percent of respondents in 2012 and 67.4 percent of respondents expressed greater willingness to practice eco-friendly lifestyles compared to 63.9 % in 2012.



CHALLENGES/LIMITATIONS

- Lack of consumer awareness on Eco-friendly Lifestyles
- Limited number of eco-friendly products and services covered by Green Credit Card
- Upfront investment costs required for the establishment of Green POS

FUTURE PLAN

Expand partnerships with retailers and manufacturers

Engage a variety of retailers and build the infrastructure for the Green Credit Card to encompass large supermarkets, department stores, small- and medium-sized supermarkets, and convenience stores.

Increase the scope of eco-products and lifestyles covered by the Green Credit Card and expand incentives

- Expand the number of green products and services and the scope of green lifestyles, including eco-friendly rental car service, car sharing, and reducing food leftovers at restaurants, to be covered by Green Credit Card.
- Increase reward points for eco-friendly products as well as the use of public transportation.

Globalize the Green Credit Card system

- Publicize the Green Credit Card as a good practice to encourage sustainable consumption and lifestyles.
- Build global partnership to disseminate the Green Credit Card to other countries.

REFERENCES

- Green Credit Card website: www.greencard.or.kr, www.ecomoney.co.kr
- Guidelines for the Operation of Green Credit Card System (July 2011)

ECO-EXPO KOREA

ECO-EXPO Korea is the biggest environmental exhibition in Korea, featuring various eco-friendly technologies, products, services and other environmental activities of businesses and the government. The exhibition has been held since 2005, and serves as a platform to raise public awareness on eco-friendly consumption and lifestyles.



ECO-EXPO KOREA aims to

- Provide information on eco-friendly technologies, products and services, thereby increasing visibility and consumer preference of relevant products in the market.
- Promote eco-friendly lifestyles via conducting eco-friendly education and participatory programs to students and consumers.
- Provide networking opportunities among businesses, thereby expanding sales outlets of eco-friendly technologies, products and services.

THE OVERVIEW OF ECO-EXPO KOREA

- Hosted by the Korean Ministry of Environment, and organized by KEITI and Korea Economic Daily
- Period and place: Four days in October every year at COEX in Seoul, R.O.K.
- Theme: “Be Green! Go Green!”
- Scope of exhibits: Central government, local governments, public institutions, civic groups, eco-friendly education and participatory programs, eco-friendly and low-carbon products, eco-friendly technology, sustainable energy, eco-friendly construction, eco-friendly transportation, eco-friendly distribution, service, finance, and eco-friendly corporations.
- Exhibition scale: 220 companies, 700 booths, and 50,000 visitors

COMPOSITION OF ECO-EXPO KOREA

Corporate Exhibition Hall for Eco-friendly Products and Services

The corporate exhibition hall showcases eco-friendly products, technologies, retailers, and building and construction, and publicizes sustainable business management.

Eco-friendly products and services



Office equipment/supplies, furniture, household items, electronic appliances, eco-design products, eco-tour, and eco-friendly fashion

Eco-friendly distribution, retails, Service



Green stores including department stores, discount stores, organic product stores, large supermarkets, finance/insurance service, logistics, etc.

Eco-friendly building & construction, transportation



Construction companies, eco-friendly construction materials including paint, wallpaper, and water saving products, etc, hybrid cars, electric cars, eco-driving products, etc.

Eco-friendly technology



Soil and ground water purification, GHG emission reduction, restoration of biological resources, resource recovery, reduction in harmful substances, renewable energy, waste-to-energy, energy efficiency technology, etc.



Other groups



NGOs and associations to promote eco-friendly activities, including climate change response, nature conservation, resource recycling, etc.



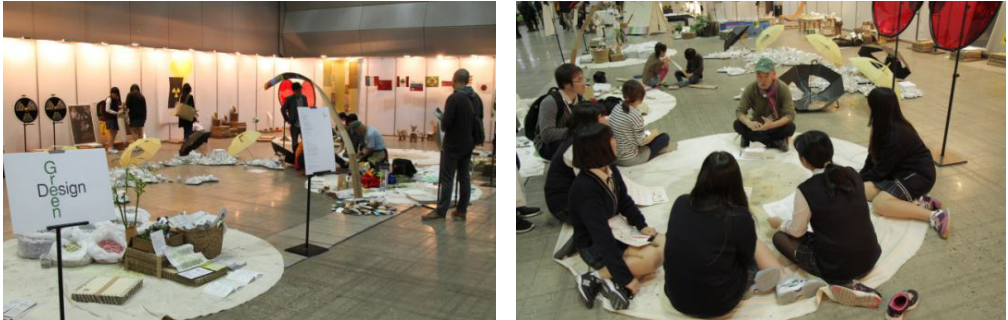
Government and Public Exhibition Halls for Environmental Policies and Activities

Environmental policies, public services, and environmental conservation activities of the government and public organizations are introduced in order to raise awareness of the public.

Institution	Descriptions
<p>Korea Environmental Industry and Technology Institute (KEITI)</p>	 <ul style="list-style-type: none"> • Offering theme zones, including eco-school and eco-house, for better understanding of eco-friendly consumption policies. • Offering education programs to visitors on eco-friendly products and lifestyles, and the benefits of eco-friendly consumption and lifestyles.
<p>Korea Vessel Recirculation Association (KVRC)</p>	 <ul style="list-style-type: none"> • Introducing the reuse bottle deposit refund center, which is operated by the KVRC. • Creating a refund center at the exhibition hall and operating participatory programs, including offering souvenirs in exchange for empty bottles.

Education and Participatory Programs to Promote Eco-friendly Consumption and Lifestyles

Various education and participatory programs are planned for exhibition visitors such as an upcycle goods handicraft session and the eco-friendly consumption campaign, in order to encourage people to experience and participate in eco-friendly lifestyles that can be applied in everyday life.




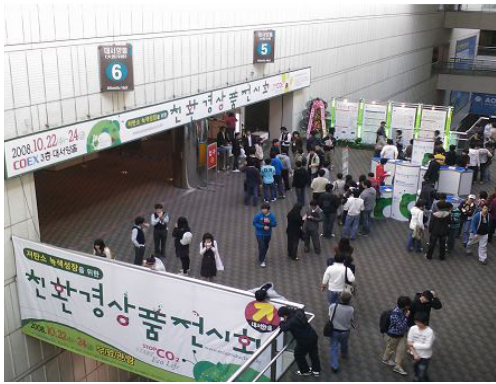
Program	Descriptions	
Eco-school	 <ul style="list-style-type: none"> • Improving the understanding on green consumption and production by offering participatory programs, including making electric vehicles and upcycle items, along with field education on eco-friendly energy and resource recycling. 	
Eco-wedding	 <ul style="list-style-type: none"> • Performing an environment-conscious eco-wedding ceremony for a multicultural couple by using eco-friendly materials including paper and corn starch to produce the necessary ceremonial goods including wedding dress, tuxedo, bouquet, cups, and flower. • Promoting the eco-wedding among the general public by offering wedding consulting services and participatory programs, such as for brides to design their own dress, in addition to conducting the actual eco-friendly wedding ceremony. 	
Green design workshop	 <ul style="list-style-type: none"> • Running a program for open discussion under the theme of environment-conscious designs and activities for implementation, including green sympathy class with green design experts. • Encouraging visitors to practice eco-friendly activities in daily life through earnest considerations of the environment. 	

Side Events including Seminars and Conferences


A number of side events are organized on the sidelines of the EXPO in order to create synergies among the different activities. The side events held in 2013 are as follows:

No.	Name of Events	No.	Name of Events
1	Presentation of yearly performances of the EcoDesign Graduate School	11	International Seminar on Green Finance
2	Conference for environment R&D technology transfer and brokerage	12	Eco-friendly product marketing strategy seminar
3	Youth sketch-talk concert	13	Briefing session on the performance of GHG target management system in public sector
4	Eco-business award	14	Presentation on best practices of reducing GHG emissions from waste treatment
5	Familiarization tour by inviting foreign press	15	Seminar to promote supply of eco-friendly construction materials
6	Awards ceremony for Green Credit Card university student contest	16	Briefing session on integrated environmental management system
7	International conference on sustainable consumption and production - Plenary session on sustainable consumption and production - ASEAN+3 green public procurement and ecolabeling workshop - Asia carbon footprint network workshop	17	Presentation on the achievements of eco-friendly management in construction sector
		18	Green certification seminar
		19	DeltaTech-Korea's counseling session on technology and development
		20	Seminar on food waste reduction technology and recycling measures
8	Green public procurement trainings for public procurers	21	International conference on eco-friendly biodegradable plastic
9	Environment Investment Conference 2013 & counseling session	22	Annual autumn conference of Korea Environmental Policy and Administration Society
10	Awards ceremony for youth environmental technology idea contest	23	Awards ceremony for a contest to practice green life and consumption

History of EXPOs

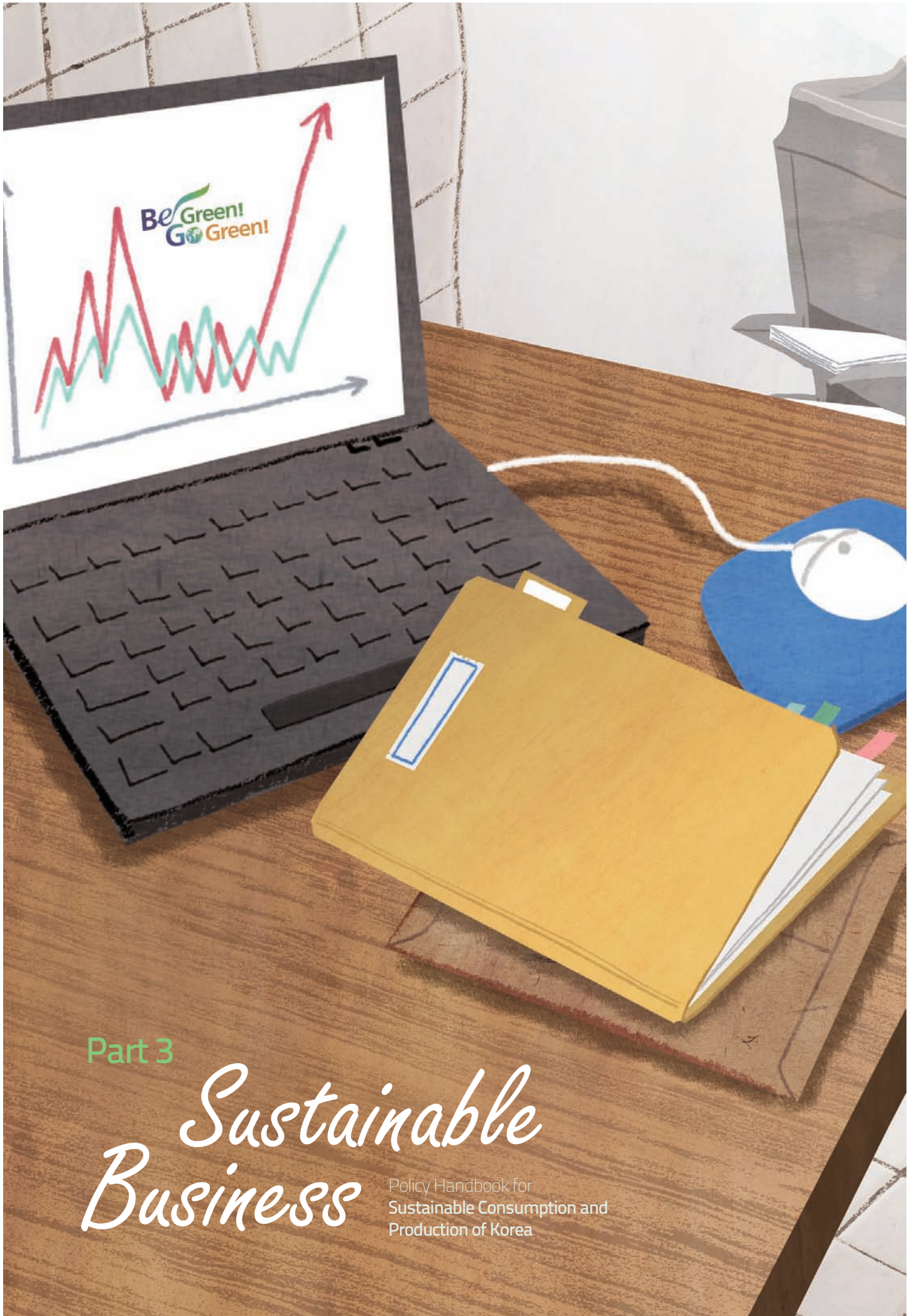
Classification	2005	2006
Period	Five days from November 8 (Wed.) to 12 (Sun.)	Four days from November 23 (Thu.) to 26 (Sun.)
Place	Ilsan KINTEX (5th hall)	Samsung-dong COEX, 3rd floor (C hall)
Scale	117 companies, 420 booths	112 companies, 420 booths
No. of visitors	17,089 persons	17,352 persons
Side event	34 events, including proclamation ceremony on sustainable production and consumption	20 events, including Warm Biz Fashion Show
Overview of exhibition hall		
Classification	2007	2008
Period	Four days from November 15 (Thu.) to 18 (Sun.)	Three days from October 22 (Wed.) to 24 (Fri.)
Place	Samsung-dong COEX, 3rd floor (C hall)	Samsung-dong COEX, 3rd floor (C hall)
Scale	111 companies, 384 booths	105 companies, 348 booths
No. of visitors	18,486 persons	15,100 persons
Side event	22 events, including Seoul's sustainable development and green procurement	20 events, including low-carbon green consumption forum
Overview of exhibition hall		

Classification	2009	2010
Period	Three days from October 20 (Tue.) to 22 (Thu.)	Three days from October 6 (Wed.) to 8 (Fri.)
Place	Samsung-dong COEX, 1st floor (A hall)	Samsung-dong COEX, 1st floor (A hall)
Scale	158 companies, 580 booths	175 companies, 620 booths
No. of visitors	30,348 persons	30,017 persons
Side event	17 events, eco-business award	19 events, including environmental industry job fair
Overview of exhibition hall		
Classification	2011	2012
Period	Four days from October 15 (Wed.) to 18 (Sat.)	Four days from October 30 (Tue.) to November 2 (Fri.)
Place	Samsung-dong COEX, 1st floor (A&B hall)	Samsung-dong COEX, 1st floor (A&B hall)
Scale	203 companies, 712 booths	215 companies, 715 booths
No. of visitors	42,403 persons	43,853 persons
Side event	20 events, awards ceremony for persons of green growth merit	22 events, awards ceremony for persons of green growth merit
Overview of exhibition hall		

Classification	2013
Period	Three days from October 29 (Tue.) to November 1 (Thu.)
Place	Samsung-dong COEX, 11st floor (A&B hall)
Scale	233 companies, 719 booths
No. of visitors	43,915 persons
Side event	23 events, eco-business award
Overview of exhibition hall	

Websites and SNSs

- ECO-EXPO KOREA website (<http://www.k-eco.or.kr>)
- ECO-EXPO KOREA blog (<http://k-eco.me/>)
- ECO-EXPO KOREA Facebook (<https://www.facebook.com/kecoexpo>)
- ECO-EXPO KOREA tweeter (<https://twitter.com/kecoexpo>)



Part 3

Sustainable Business

Policy Handbook for
Sustainable Consumption and
Production of Korea



ECO-BUSINESS AWARD

The Korea Eco-Business Award is a reputational incentive to reward organizations or individuals that contributed to the development of ecological technology and Industry; the mitigation of climate change; and eco-friendly consumption and production.

Public institutions, non-profit organizations, enterprises, and individuals are eligible for the award. The award is divided into four sub-sectors including eco-friendly consumption and production; environmental technology and industries; climate change mitigation; and persons of merit.

The award is hosted by the Korean Ministry of Environment, and operated by the Korea Environmental Industry & Technology Institute and the Korea Economic Daily. The notice of application is released every May, and the awarding ceremony is held on the sidelines of the ECO EXPO KOREA.

The recipients of the award are encouraged share their successful eco-friendly practices and disclose related sites if requested by relevant institutions.

Legal Basis

- Article 33 (reward) of the Support for Environmental Technology and Environmental Industry Act
- Article 15-2 (Fostering of Association Related to Promotion of Green Products) of the Act on Promotion of Purchase of Green Products
- Five-Year Plan for Green Growth (9-2-6)
- Overall matters concerning the award screening shall be governed in accordance with the Awards and Decorations Act and the Enforcement Decree of the same Act, Government Commendation Regulation, and Guidelines for Government Decorations of 2014.



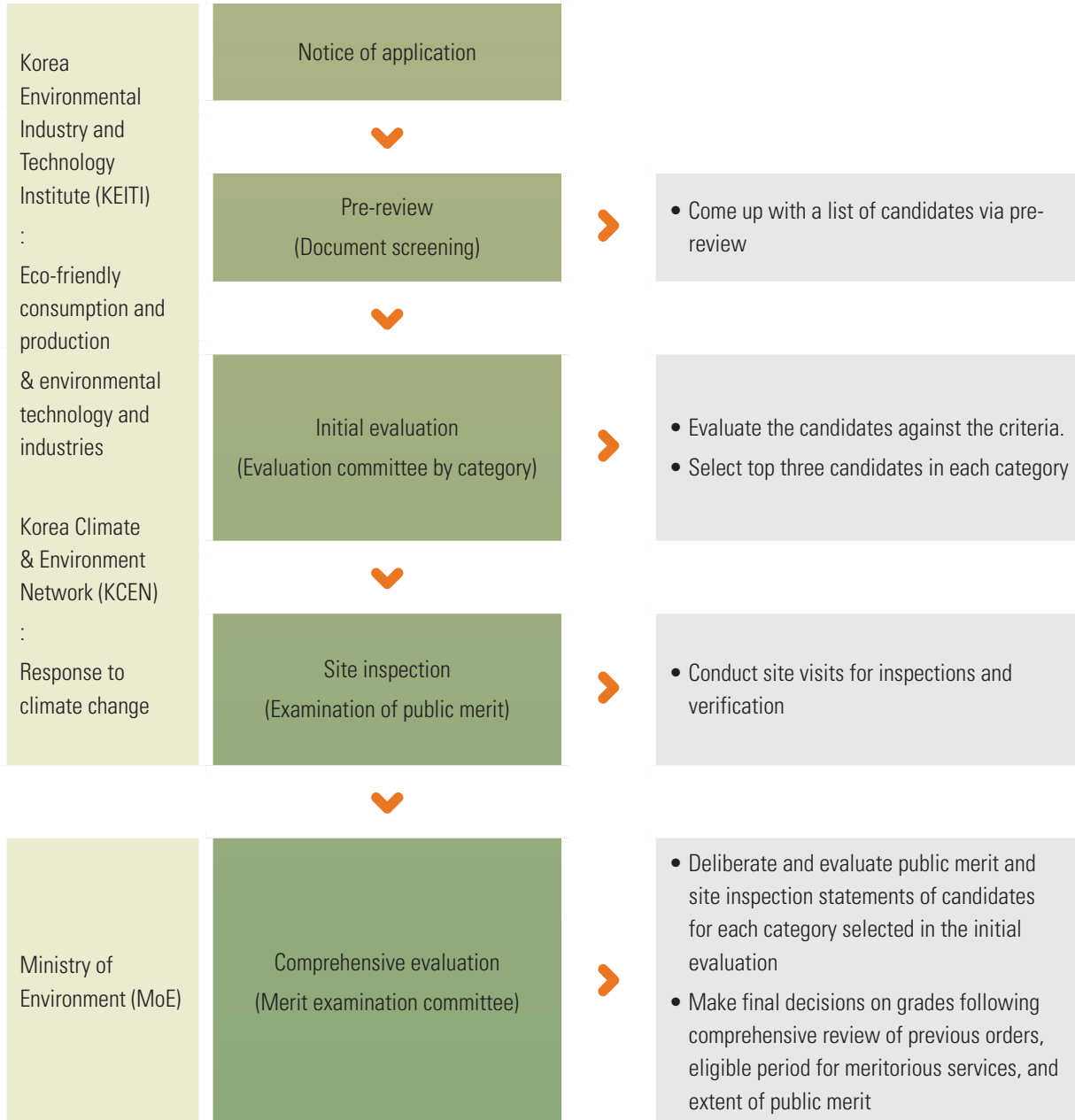


Criteria of the Award

Category		Criteria	Grade and No. of Awards
Eco-friendly consumption and production	Eco-friendly products	Enterprises producing eco-friendly products that reduce energy consumption and minimize the generation of pollutants	Presidential citation: ○ Prime Minister's citation: ○ Environment Minister's citation: ○
	Eco-friendly purchase	Organizations or enterprises contributing to the prevention of environment pollution through the purchase of green products or the application of eco-technologies	
	Eco-friendly distribution	Enterprises or NGOs contributing to the promotion of eco-friendly consumption and distribution	
	Eco-friendly management	Enterprises or organizations establishing eco-friendly management systems through sustainable management and low-carbon production processes	
Eco-friendly technology and industry	Eco-technology Development	Enterprises or organizations contributing to the development of eco- technologies	Presidential citation: ○ Prime Minister's citation: ○ Environment Minister's citation: ○
	Eco-technology Dissemination	Enterprises or organizations contributing to the dissemination of eco-technologies	
	Development of eco-industry	Enterprises contributing to the development of environmental industries by achieving outstanding business records and creating jobs	
	International trade of eco-products	Enterprises contributing to the international trade of eco-industry related materials, machinery, products, technologies and facilities.	
Mitigation of climate change	Public sector	Organizations, schools, NGOs, or enterprises contributing to climate change mitigation by adopting low carbon and eco-friendly lifestyles and management.	Presidential citation: ○ Prime Minister's citation: ○ Environment Minister's citation: ○
	Private sector		
Persons of merit		Executives, employees, and other individuals of merit at enterprises, public institutions or civil society organizations contributing to Eco-friendly Consumption ·Production; Eco-Technology & industry; and Climate Change Mitigation	Orders and medals of honor: ○ Presidential citation: ○ Prime Minister's citation: ○ Environment Minister's citation: ○



Screening Procedures



BOX. Rules and Regulations

Eligible criteria for the award recipients

- Candidates are required to have a certain period to acts of public merit, more than 15 years for orders, more than 10 years for medals of honor, and more than five years for citations. However, the decoration for retired public officials shall be based on separate standards.

Awards cannot be given in duplicate in following cases:

- Persons decorated with orders or medals of honor are prohibited from i) being awarded another order or medal of honor within five years from the date of the original conferral, regardless of classifications of orders or medals of honor and ii) being awarded the Presidential citation or Prime Minister's citation again within two years from the date of original conferral.
- Persons decorated with the Presidential citation or Prime Minister's citation are prohibited from being awarded (orders, medals of honor, Presidential citation or Prime Minister's citation) again by the government within two years from the date of original conferral.
- * Decorations for retirement, government awards, and exemplary public officials are not subject to the prohibition period for duplicate decorations.
- Any organization that is awarded a group citation shall not be awarded again for the same merit within two years from the date of initial conferral.
- * However, the prohibition period for duplicate decorations shall not apply to outstanding institutions cited based on evaluation results in accordance with the Basic Government Performance Evaluation Act.

Recommendations for Decorations are restricted in following cases:

- Persons with past convictions for a criminal offense, etc.;
- Business sites and respective executives, etc. on the public announcement list in relation to industrial accidents, etc. pursuant to the Occupational Safety and Health Act;
- Corporations and respective executives in violation of the Monopoly Regulation and Fair Trade Act;
- Business owners whose name is publicly disclosed or whose information is provided to the Korea Federation of Banks in connection with delayed payment of wages pursuant to the Labor Standards Act;
- Persons deemed ineligible for government decorations due to being under investigation or causing social controversy through various types of media coverage;
- Persons deemed ineligible in accordance with the Awards and Decorations Act, 2014 Guidelines for Government Decorations, etc.



Screening Criteria Table

1. Eco-friendly Consumption and Production & Eco-technology and Industry Category (250 credits for public institutions, enterprises, and civic groups)

1) Common Evaluation (additional five credits are given to 50 credits in total)

Classification	Item	No.	Descriptions	Credits Available	Credits Acquired
Common	Business performance	1	Period of business operation (from startup to present)	20	
		2	Sales records and profit contribution for the preceding two years		
		3	Organization system and education for specialized workforce		
		4	Competitiveness in relevant category and strategies for differentiation		
	Sustainable management activity	5	CEO's determination and interest in pursuing management innovation	20	
		6	Performance and analysis of sustainable management activity		
	Social contribution	7	Implementation system of vision/strategy for social contribution	10	
		8	Self-evaluation records for social contribution activities		
		9	Activities to benefit local communities and social contributions		
Additional credits	Participation in ECO-EXPO KOREA (limited to eco-friendly consumption and production)	10	Records of participation in ECO-EXPO KOREA	(5)	
		11	Plan to participate in this year's ECO-EXPO KOREA		
Total				50 (5)	

2) Evaluation for Each Category (200 credits)

- Eco-friendly Products

Classification	Item	No.	Descriptions	Credits Available	Credits Acquired
Eco-friendly products	Technology development and production of products	1	Eco-friendliness compared to other products of the same purpose	70	
		2	Quality compared to other products of the same purpose		
		3	Extent of environmental friendliness in stages of production, distribution, and end of product life		
		4	Whether technologies certified either by new environmental technology certification or green technology certification have been applied		
		5	General utility of products		
	Product management and certification	6	Compliance of environmental regulations and agreements by manufacturing plants	60	
		7	Compliance of Act on Fair Labeling and Advertising		
		8	Whether data on the harmful aspects of products is being managed		
		9	Extent of obtaining official eco-friendly certification for applicant products		
		10	Proportion of green products among products currently in production (for sale)		
	Sales of products	11	Sales records of products (for the preceding two years)	40	
		12	Overseas export records		
		13	Product purchasing convenience of consumers		
	Promotion of products	14	Records of implementing green marketing on products	30	
		15	Efforts to provide information on environmental performance of products		
		16	Operation of the Green Credit Card system to encourage the consumption of eco-friendly products		
Total				200	



- Eco-friendly Purchase

Classification	Item	No.	Descriptions	Credits Available	Credits Acquired
Eco-friendly purchase	Establishment of basic framework for purchases	1	Establishing and implementing a medium- to long-term plan for green purchase	80	
		2	Establishing and enforcing regulations on green purchase		
		3	Operating organizations and workforce dedicated to green purchases		
		4	Reflecting eco-friendly green purchase principles or criteria into product purchase orders and construction specifications		
		5	Whether a green purchase system has been established		
		6	Efforts to participate in government policies designed to encourage green purchase		
	Implementation of purchases	7	Educating employees on green purchase	60	
		8	Providing information on purchase of green products (new environmental technology, green technology certification)		
		9	Efforts to promote green purchase		
		10	Efforts to encourage implementation of green purchase		
		11	Other efforts to facilitate green purchase		
	Records and implementation of evaluation	12	Green purchase records	60	
		13	Records for indirect purchase of eco-friendly construction materials		
		14	Performance in comparison to green purchase implementation plan		
		15	Whether green purchase records have been disclosed		
		16	Whether green purchase records have undergone in-house inspection		
		17	Whether green purchase records have been reflected in evaluating each department		
		18	Whether incentives such as commendations are offered to high-performance employees		
Total				200	

• Eco-friendly Distribution

Classification	Item	No.	Descriptions	Credits Available	Credits Acquired
Eco-friendly distribution	Establishment of basic framework for distribution	1	Fulfillment rate of the business plan for promotion and distribution of eco-friendly products	70	
		2	Establishing and implementing guidelines for the distribution of eco-friendly products		
		3	Operating organizations and workforce dedicated to the distribution of eco-friendly products		
		4	Educating employees, customers and stakeholders to encourage the distribution of eco-friendly products		
		5	Efforts to participate in government policies		
	Implementation of the distribution of eco-friendly products	6	Efforts to establish a cooperative network with the local community to promote the distribution of eco-friendly products	70	
		7	Performance in pursuing campaigns for the distribution of eco-friendly products		
		8	Educating customers and the local community to identify eco-friendly products		
		9	Efforts to promote the Green Credit Card system to encourage the consumption of eco-friendly products		
		10	Whether distributors and suppliers of eco-friendly products are given support		
	Records of distribution and evaluation	11	Performance in distribution and supply of eco-friendly products and management of purchase records	60	
		12	Improvements in distribution and supply records of eco-friendly products		
		13	Whether records of distribution and supply of eco-friendly products are disclosed		
		14	Whether incentives such as commendations are offered to high-performance employees		
Total				200	



• Eco-friendly Management

Classification	Item	No.	Descriptions	Credits Available	Credits Acquired
Eco-friendly management	Basis for implementation	1	Whether environment vision and guidelines have been established	60	
		2	Whether plans and goals for sustainable management have been established		
		3	Whether a sustainable management system has been established through green company designation, ISO 14001 certification, etc.		
		4	Commitment to sustainable management among executives		
		5	Whether awareness of sustainable management is being disseminated and employees are offered training and education		
		6	Whether a plan is in place to support suppliers in their efforts to implement sustainable management		
	Implementation of environmental improvement	7	Whether greenhouse gas (GHG) emissions from the business place are calculated	60	
		8	Whether GHG and environmental pollution are diagnosed for products or manufacturing process through life cycle analysis (LCA) and eco-design		
		9	Whether education is provided to nurture experts in GHG reduction		
		10	Whether specific activities are carried out to reduce GHGs and environmental pollution (including by the suppliers)		
		11	Whether activities are performed to reduce energy usage		
		12	Whether eco-friendly products and services are developed and promoted		
	Records of sustainable management	13	Records of GHG reductions in business place such as clean development management (CDM)	80	
		14	Records of sustainable management through managing suppliers		
		15	Whether activities for sustainable management (information) are disclosed through environment (sustainability) reports		
		16	Support and cooperation for activities in environment conservation of community		
		17	Whether any environment-related certification (eco-label, carbon footprint label, etc.) has been obtained		
		18	Whether GHS certification has been obtained for the business site		
Total				200	

• Eco-technology development

Classification	Item	No.	Descriptions	Credits Available	Credits Acquired
Eco-technology development	Technological development efforts	1	Performance in R&D including research papers, and application and registration of patents	40	
		2	Performance quality in R&D for the relevant technology		
		3	Contribution to the development of the relevant technologies		
	Excellence of performance	4	Contribution to environmental improvement	60	
		5	Originality and innovation of the technology		
		6	Level and difficulty of the technology		
	Utility of the technology	7	General utility and ripple effect of the technology	60	
		8	Possibility to improve and develop the core technology		
		9	Efforts for promoting a wide range of public use or marketing in order to commercialize the technology		
	Ripple effect of performance	10	Contribution to workforce training or job creation	40	
		11	Public availability or marketability (Sales records/ import replacement)		
		12	Ripple effect on environment policy or industry		
Total				200	



- Eco-technology dissemination

Classification	Item	No.	Descriptions	Credits Available	Credits Acquired
Eco-technology dissemination	Efforts for technology development	1	R&D capacity (department and workforce dedicated to research, etc.)	40	
		2	Continuity of research		
		3	Conditions for technological development		
		4	R&D investment ratio		
		5	Contribution to workforce training or job creation		
	Technological attributes	6	Contribution to environmental improvement	60	
		7	Originality and novelty of the technology		
		8	Whether the technology has obtained environment-related certification		
		9	Whether the technology has obtained a patent or model utility		
	Utility of technology	10	Application records of the technology in the relevant field	60	
		11	General utility and ripple effect of the technology		
		12	Level and difficulty of the technology		
		13	Development methods for the technology		
		14	Possibility to improve and develop the core technology		
	Potential for market penetration	15	Degree of product value and practical utility	40	
		16	Marketability (export records/import replacement)		
		17	Technology with low cost and high efficiency		
		18	Marketing efforts for the commercialization of the technology		
Total				200	

• Nurturing Eco-industry

Classification	Item	No.	Descriptions	Credits Available	Credits Acquired
Nurturing Eco-industry	Excellence of corporate management	1	Strategies for enhanced competitiveness and differentiation of core businesses	60	
		2	Feasibility of business goals and action plan		
		3	Contribution of core businesses to environmental improvement		
	Excellence of business records	4	Expertise of core businesses in the environmental area	60	
		5	Share of the environmental area out of total sales (average of the preceding two years)		
		6	Sales growth in the environmental area (average of the preceding two years)		
	Contribution to job creation and development of the environmental industries	7	Employment growth compared to the previous year	80	
		8	Pro-activeness of the plan for employment and job creation		
		9	Performance of efforts to develop the environmental industries		
		10	Participation in government policies to facilitate the environmental industries		
Total				200	



- International Trade of eco-products

Classification	Item	No.	Description	Credits Available	Credits Acquired
International Trade of Eco-Products	Possession of technologies	1	Possession of patents and model utility rights for environmental technology	40	
		2	Ratio of R&D investment		
		3	R&D capacity (department and workforce dedicated to research, etc.)		
		4	Possession of environment-related certifications		
	Export records	5	Share of sales in the environmental area	70	
		6	Ratio of exports to sales		
		7	Target countries for exports by the environment industries		
		8	Average export growth in preceding three years		
		9	Export records in preceding three years		
	Export competence	10	Establishment of plans and strategies for the accomplishment of export goals	70	
		11	Possession of overseas sales organization and dedicated export-related workforce		
		12	Records of overseas marketing (exhibitions, participation in a market exploitation team, etc.)		
		13	CEO's commitment and efforts to develop exports		
	Contribution to export	14	Contribution to exports in the environmental area	20	
		15	Participation in government policies designed to support exports in the environmental industries		
Total				200	

2. Eco-friendly Consumption and Production & Eco-technology and Industry Category (200 credits for persons of merit)

Classification	Item	No.	Descriptions	Credits Available	Credits Acquired	
Persons of merit category	Experience and award-winning records in environment area	1	Years of continuous employment in environment-related area	80		
		2	Records of environmental awards inside and outside of the organization			
		3	Records of completing environment-related education courses			
		4	Participation in environment-related events, conferences, campaigns, etc.			
	Contribution to environmental improvement		5	Contribution to environmental improvement by encouraging green consumption and production and development of the environment industries		80
			6	Participation in research related to eco-friendly consumption and production and the environmental industries		
			7	Contribution to environmental certification such as new green technology, green technology certification, and the eco-label		
			8	Contribution to sales growth in eco-friendly products and technologies		
			9	Records in improving systems for promotion of green consumption and productions and development of the environment industries		
	Dissemination efforts		10	Determination and efforts to participate in environment management		40
			11	Media activities to encourage eco-friendly consumption and production and development of the environmental industries		
			12	Activities to benefit local communities and social contributions		
			13	Other contributions in encouraging eco-friendly consumption and production, developing the environmental industries and establishing the basis for sustainable growth		
Total				200		



3. Mitigation of Climate Change Category (200 credits for public institutions, enterprises, civic groups and persons of merit)

Classification	Item	No.	Descriptions	Credits Available	Credits Acquired
Mitigation of climate change	Suitability	1	Conformity to the theme of eco-friendly lifestyles	60	
		2	Report detailing faithful activities (for example, schools are offered education on GHG diagnosis)		
	Potential for dissemination	3	Cases applicable to other institutions and regions	40	
	Utility	4	Cases that can be utilized to disseminate Green Start (campaign for the practical realization of green lifestyles)	30	
	Sustainability	5	Cases that can be performed on an ongoing basis	30	
	Originality (creativity)	6	Originality of cases	20	
		7	Creativeness of cases		
	Excellence	8	Exemplary cases of other organizations`	20	
Total				200	

Green-Up

Consultation for Environmental Management of SMEs

Green-Up is a business assistance program that provides environmental management consultations with SMEs aimed at enhancing competitiveness in market, saving resources, and improving environmental performance.

Green-Up aims to

- Provide environment consulting customized for SMEs in different sectors in order to address major environmental issues.
- Publish standard environmental management manuals or guidelines for individual sectors.

Legal Basis

Article 25 (Facilitation of Enterprises' Green Management) of the Framework Act on Low Carbon Green Growth

Working Mechanism

KEITI selects consulting agencies and lead agencies - cooperatives or associations of SMEs that form a consortium with more than ten member companies, in accordance with its internal selection evaluation standards and signs agreements with associations and consulting agencies, respectively.

Consulting agencies support cooperatives or associations in various issues, such as the certification of green companies, education to foster dedicated environmental management staff, establishment of an environmental management system, publication of environment reports, and eco-labeling, which aims to proliferate such support mechanisms to participating/member companies. Participating companies are defined as member companies of lead agencies as SMEs defined in Article 2 of the Framework Act of Small and Medium Business.

Participating companies improve their productivity and eco-efficiency throughout the lifecycle of the products through tailored approaches.

- (Phase I) Pre-examine the level of environmental management and identify issues for potential improvement.
- (Phase II) Provide in-depth examination on the key issues identified during the phase I and come up with technical solutions on each process.
- (Phase III) Provide guidance on how to implement the solutions in order to improve environmental management.
- (Phase IV) Analyze economic and environmental performance improvements resulted from the adoption of the solutions in each process.

Table 1. Selection Criteria for Green-up Program

Evaluation Category	Sub-category	Evaluation Grade (circle where appropriate)					Points
		excellent	good	fair	insufficient	poor	
Types of Consulting (35)	Necessity of consulting and adequacy of goals	15	12	9	6	3	
	Specificity of consulting offered	10	8	6	4	2	
	Expected outcome of consulting	10	8	6	4	2	
Capability (45)	Validity of consulting strategies	10	8	6	4	2	
	Suitability of consulting schedule, plan, and methodology in each stage	15	12	9	6	3	
	Level of consulting capability and possibility of attaining final goals	10	8	6	4	2	
	Track records for consulting performance for recent three years	10	8	6	4	2	
follow-up management (20)	Validity and efficiency of follow-up plan	10	8	6	4	2	
	Adequacy of confidential security system and measures	10	8	6	4	2	
Evaluation Points							points

In 2014, consulting service has been offered to two participating agencies within the budget of 120 million won for eight months.

Target agencies			Mating Fund	
Consulting Agency	Recipient Agency		Government Grants	Private Contribution
	Lead Agency	No. of Participating Companies		
Environmental consulting agency	Cooperatives consisting of owners of SMEs incorporated under the Small and Medium Enterprise Cooperatives Act and Associations registered as a private foundation with government ministries, including the MoE	10 or more – fewer than 15	Up to 60 million KRW (60,000 USD) within 90 percent of consulting fees	10 percent or more of consulting fees in cash
		15 or more – fewer than 20	Up to 120 million KRW (120,000 USD) within 90 percent of consulting fees	Same as above

MAJOR OUTCOMES

Support was given to 27 companies of two associations, as well as two consulting agencies in 2013.

Lead Agency	Participating Companies		Contract Period	Mating Fund	
	No. of Companies	Business Type		Government Grants	Private Contribution
Korea Diecast Industry Cooperative	15	Manufacture of diecast parts and molds, etc.	June. 26, 2013-November 29	100 million KRW (100,000 USD)	12 million KRW (12,000 USD)
EF Consulting					
Korea Paint & Printing Ink Industry Cooperative	12	Manufacture of paint and ink	June 26, 2013-November 22	50 million KRW (50,000 USD)	5.56 million KRW (5,560 USD)
Chemtopia					

Fifteen SMEs are provided consulting service through the Korea Diecast Industry Cooperative.

Lead Agency	Participating Companies	Consulting Details
Consulting Agency		
Korea Diecast Industry Cooperative	KAC, Dongyang Die Casting, Samo Precision, Daejin Industry, Young Diecasting, Yong Sun Precision, Youjin Tecor, Ilshin Diecasting, Jaeil Metal, Jungang Cast, Cheongam Metal, Castman, Halla Cast, Hanjin Diecasting, Cubics (15 companies)	<ul style="list-style-type: none"> • Publishing environmental reports • Offering education to foster dedicated environmental management staff and developing training materials • Producing and distributing manuals for improving diecasting industrial processes • Offering examination and guidance on procedural improvement
EF Consulting		

Twelve SMEs are given consulting service through Korea Paint & Printing Ink Industry Cooperative.

Lead Agency	Participating Companies	Consulting Details
Consulting Agency		
Korea Diecast Industry Cooperative	Gamro Fine Chemical, Gyungdo Chemical Ind., Daehwa Paint MFG, Dong Young Chemical, DongHae Chemical Industrial, Bukwang Chemical Industry, Saelim, Shindong Paint, SKS Paint, Union Chemical Industry, Jooyoung Industry, Chunilpaint (12 companies)	<ul style="list-style-type: none"> • Producing and distributing manuals in response to the Act on Registration, Evaluation, Etc. of Chemical Substances, as well as offering relevant education • Responding to the Act on Registration, Evaluation, Etc. of Chemical Substances by building inventory of chemical substances • Examining current management status of chemical substances by conducting site visits • Collecting data, building inventory, and offering technical assistance • Checking whether the materials handled by each business are in line with the material-related regulation
Chemtopia		

Two types of standard manuals were published for environmental management by business type.

Lead Agency	Descriptions
Korea Diecast Industry Cooperative	A manual to improve diecasting processes including: <ul style="list-style-type: none"> • Diecasting process improvements • General process improvements
Korea Paint & Printing Ink Industry Cooperative	A manual to build an inventory of chemical substances in response to the Act on Registration, Evaluation, Etc. of Chemical Substances, including: <ul style="list-style-type: none"> • Inventory overview • Guidelines on composing and preparing inventory • Utilization of inventory • Chemical nomenclature

IMPLEMENTING STRATEGY

- Consulting service is provided with cooperatives or associations comprising of a number of participating businesses.
- Selection of recipient companies must aim to address current environmental priorities such as relief from chemical incidents damage.
- Monitoring has been conducted on follow-up management between consulting agencies and recipient agencies to ensure the continued proliferation of the policy after the expiration of contracts for 27 enterprises.
- Capacity for environmental management in SMEs has been strengthened and the foundation to promote environmental management has been established through education on the utilization of existing standard manuals for environmental management.

FUTURE PLAN

- Develop standard models for environmental management of SMEs in each business area, which can be replicated in other business in the same area. Identify and disseminate good practices in the key business sector with high environmental impacts.
- Conduct a survey on satisfaction of recipient companies, which consists of various items, such as environmental management contribution and achievement, and professionalism and diligence of consulting agencies in a bid to improve the quality of support for environmental consultation.
- Monitor environmental management performance of recipient companies to measure the progress of environmental performances.

REFERENCES

Guidelines for the Operation of Green Up Program (October 2010)



Eco-design Program

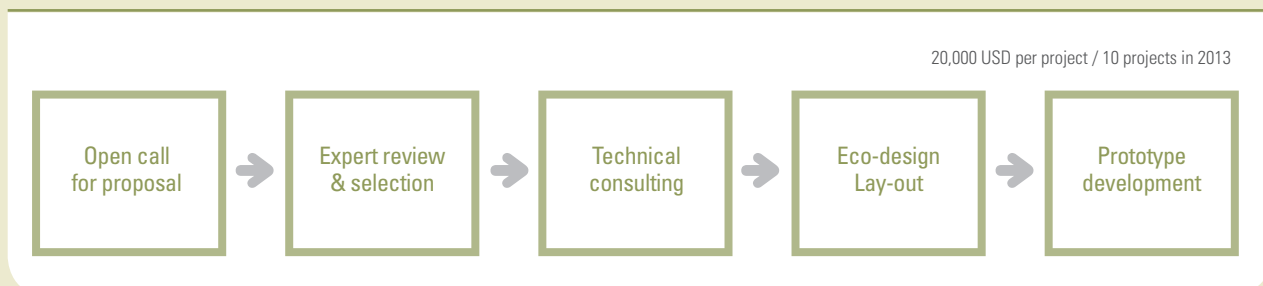
Eco-design program aims to facilitate the eco-innovation of products & services by providing technical and financial assistances to SMEs.

Eco-design is an approach to design a product with consideration for the environmental impacts of the product during its life cycle. It has become the basis of the EU directives on RoHS(Restriction of the Use of Hazardous Substances in Electrical and Electronic Equipment), ELV(End-of-life Vehicles), WEEE(Waste Electrical and Electronic Equipment), ErP(Eco-design Requirements for Energy Related Products), REACH (Registration, Evaluation, Authorization and Restriction of Chemicals) and eco-labeling.

However, the minimum environmental standard proposed under the principle of eco-design may potentially hamper innovation, as meeting minimum requirements is recognized as a goal itself. Instead, the eco-design program in Korea is operated to encourage SMEs to develop and commercialize innovative products and services that address critical environmental problems. The eco-design program is comprised of the following:

- Ideas Contest for the innovative ideas of eco-products
- Financial and technical support for the development of prototype model
- Technical support for the acquisition of patent and eco-label
- Promotion of eco-designed products at ECO EXPO KOREA

Figure 1. Working Procedure of Eco-design Program



In addition, exemplary practices for eco-design products and services are compiled and uploaded at the Eco-design Information Platform. So far, about 400 eco-design practices around the world are identified and shared via the Eco-design Information Platform.

Legal Basis

Article 5-2 (Korea Environmental Industry and Technology Institute) and 26 (Support for Development, etc. of Standards for Certification of Eco-Label) of the Support for Environmental Technology and Environmental Industry Act

Major Milestones

Eco-design software (concept of eco-design, information on environmental regulations, LCA tools, case studies)

- 2002: Developed eco-design guidelines and software including LCA tools
- 2003 to 2006: Conducted trainings for experts from different sector
- 2005: Operated Information Web-platform for Eco-design to disseminate exemplary practices
- 2007: Provided technical consultations for SMEs
- 2011 to 2013: Provided financial assistance for prototype model development of 15 products
- 2013: Initiated Idea Contest for eco-design products and services

Future Plan

- Facilitate market penetration of eco-designed products including public procurement market
- Provide networking opportunities among environmental experts, product and service designers, and investors, etc
- Increase consumer awareness on eco-design products
- Align eco-design program with the new national development paradigm Creative Economy



BOX 1. Prototype models of eco-designed product sponsored by KEITI



Slim Lined Digital Lecture Desk

Development Background

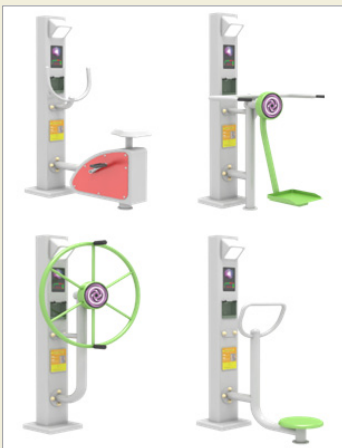
- Generally, conventional digital lecture desks are heavy and large.
- It is hard to maintain and repair because of large number of components and complicated cable connection.
- There are unnecessary energy loss due to a lack of consideration of energy consumption

Creative Ideas & Technologies

- Integration of multiple devices (e.g., controller, amplifier, power supply) into one controller
- Application of USB integrated signal transmission technology
- Application of remote monitoring & control system

Sustainable Features

- Resource reduction, space saving, convenience of movement, and efficiency of transportation by reductions in the size and weight
- Reductions in power consumption by 50% and in after-sales service cost by over 90%



Human-Powered Exercise Equipments

Development Background

- The demands for exercise and play equipment specialized for economic values of apartments and high-quality of parks are on the rise.
- Exercise and play equipment also require environmental factors and functional diversity

Creative Ideas & Technologies

- Use of exercise energy of users (low-rotation: 80rpm, high efficiency: 60% or more)
- Renewable energy applications such as charging of street lights and mobile phones and contribution to consumer convenience

Sustainable Features

- Reduction in resources and improvement in maintenance by standardizing the body part and assembling a variety of exercise equipment
- Decreases in metals and the coating area by reducing the weight and size



Waste Shell Recycled Block

Development Background

- There is need of using marine wastes as resources.
- The technology of making eco-friendly construction materials out of natural substances is developed.

Creative Ideas & Technologies

- Non-flammable and environmental-friendly construction material made by high-heating & high-pressure forming process
- Emission of anions and far-infrared light due to the unique property of shells
- The possibility of developing the process technology to replace the conventional plaster boards

Sustainable Features

- Possible to replace the conventional plaster boards with the recycled material
- Possible to use as internal sound-proof and insulation materials
- Contributing to environmental improvement & promotion of economic activity in coastal regions



Automata Education-Kit

Development Background

- Avoiding hazardous contents in toys
- Safe shoddy toys
- Use of recycled paper

Creative Ideas & Technologies

- Use of materials being capable of completely preventing various hazards
- Fulfillment of the original functions of toys
- Application of eco-friendly manufacturing process

Sustainable Features

- Offering a safe play environment without inclusion of any chemical substances
- Improving a production speed about five times higher and saving energy over 50% by special laser cutting technique
- Reducing in productivity cost, material cost, and transport cost due to the property of corrugated cardboards, and ultimately leading to a reduction in consumers' cost by about 60%



Water-Separable OPP Reel Pad

Development Background

- PET bottles require the removal of their impurities for recycling which adds value to recycling industries
- Conventional labels attached on PET bottles are difficult to remove which causes higher cost for recycling the bottle

Creative Ideas & Technologies

- Application of 'water separable adhesives', which do not melt in high-temperature water and are 100% separated from PET bottles
- Not separation from PET bottles as contacting water during distribution process

Sustainable Features

- Easy label separation by consumers thanks to their special adhesion property
- No additional chemicals are required to separate labels, adhesives do not melt in water so that they contribute to prevention of water pollution
- Off-flavor caused by use of hot-melt at workplace, and no fluff-flying, no cleaning



Non-Electric Automatic Flushing Toilet Seat

Development Background

- Per capita water use in Korea is over two-fold higher than that in other European countries
- Water rates are on the constant rise in consideration of the availability and consumption of water source.
- 50-70% of water use in general buildings is used in restrooms.

Creative Ideas & Technologies

- Water-saving effect simply by the replacement of a toilet seat
- Quality & Design Up, and the Cost of wastes Down by product improvement (e.g., getting slim, a reduction in parts, application of soft open & close)

Sustainable Features

- Water saving of 30-50% by automatic detection of pee & pooh
- Easy installation and zero maintenance cost thanks to non-electricity & non-batteries



BOX 2. Guideline for Eco-design Applications

1. Overview

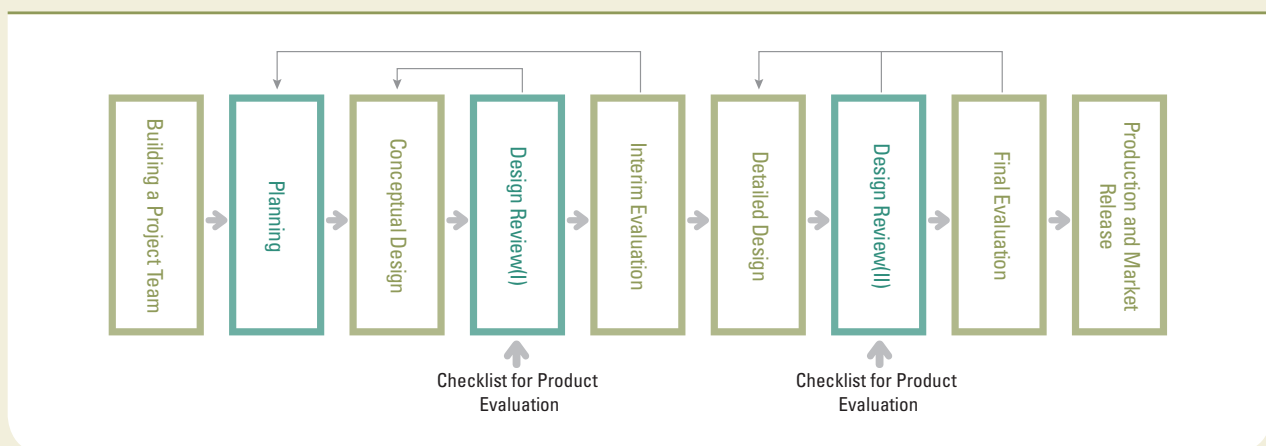
Since the early 2000s, there has been growing market demands on manufacturers for eco-design due to the emergence of domestic and international environmental regulations related to products. In response, export-oriented manufacturers attempted to adopt the eco-design of their products, but no clear and concrete definition for this sort of design was available.

This section seeks to provide systematic explanations for each step required in order for manufacturers to meet eco-design requirements such as the EU Energy-using Product (EuP) Directive. This chapter is written in accordance with international standards including ISO TR 14062 and IEC 62430, and addresses six steps: product modeling, analysis of products' environmental performance, analysis of stakeholder requirements, derivation of environmental parameters, identification of components in need of improvement, and establishment of strategies and tasks for eco-design.

An understanding of the product and the related development process must be a priority in eco-design. Any given product is a combination of solutions to allow the implementation of functions designed to satisfy the VOC. Here, VOC stands for Voice of the Customer, connoting the desires of the customer as the end-user of a particular product. Functions here serve as the technical implementation of the VOC, indicating what the product should offer customers from a technical standpoint.

A typical product development process advances through a series of phases: product planning, conceptual design and detailed design. The identification of the VOC, functions and solutions mentioned above falls under the product planning phase, i.e. the process of deriving a conceptual design for the product. Although the concrete form of the product is not yet available in the conceptual design phase, detailed specifications are produced on the basis of the output of this phase. <Figure 1> shows a typical product development process.

<Figure 1> Product Development Process



Eco-design is the aforementioned product development process including the consideration of environmental performance of the product. In other words, eco-design is a process of integrating environmental aspects into the initial product design and development (ISO TR 14062). This process includes discerning processes, materials and components that may have a potential negative impact on the environment throughout a product's life cycle; identifying environmental parameters through the analysis of the VOC; and devising alternative designs in order to improve the parameters.

The term 'environmental aspect' includes indicators, in the form of environmental parameters, representing how much a negative impact a product may have on the environment throughout the course of its life cycle. The EU EuP Directive (Annex A, Part I) suggests that a product life cycle should be considered as six steps: raw materials acquisition; manufacturing; packaging, transport and distribution; installation and maintenance; use; and end-of-life. In general, installation and maintenance are included within the use phase.

The EU directive (Annex A, Part I) proposes that five environmental aspects be considered in each phase of the product life cycle: consumption of materials, energy and other resources; emissions into air, water and land; pollution resulting from physical effects such as noise, vibration, radiation and electromagnetic fields; generation of waste materials; and potential for reuse, recycling and collection of materials and energy. In principle, these environmental aspects are classified according to the characteristics of the product.

The key point here is the environmental parameters, since they are concrete indicators that represent the environmental performance of a product. As the parameters are measurable and consequently quantifiable, their values can be adjusted by redesigning a product. One of the most crucial phases in eco-design is the identification of such environmental parameters, especially those required to improve the environmental performance of the product.

The analysis of environmental aspects is conducted from two perspectives: one being an analysis of the product life cycle and the other that of stakeholder requirements. These twin analyses identify those environmental parameters that require improvement. At this phase, the analyses should be preceded by product modeling, which sets the boundaries of the product system.

The analysis of the product life cycle investigates the major environmental factors generated by a product throughout that lifecycle, a process known as an analysis of product's environmental performance. Matrices, such as Life Cycle Thinking (LCT), are widely applied as an analysis tool. The analysis of stakeholder requirements involves identifying the stakeholders in the product, analyzing their requirements and deriving major environmental parameters. Tools used in this step include Environmental Quality Function Deployment (EQFD) and Environmental Benchmarking (EBM). There is another widely-used tool, Quality Function Deployment Environment (QFDE), which identifies components in need of improvement.

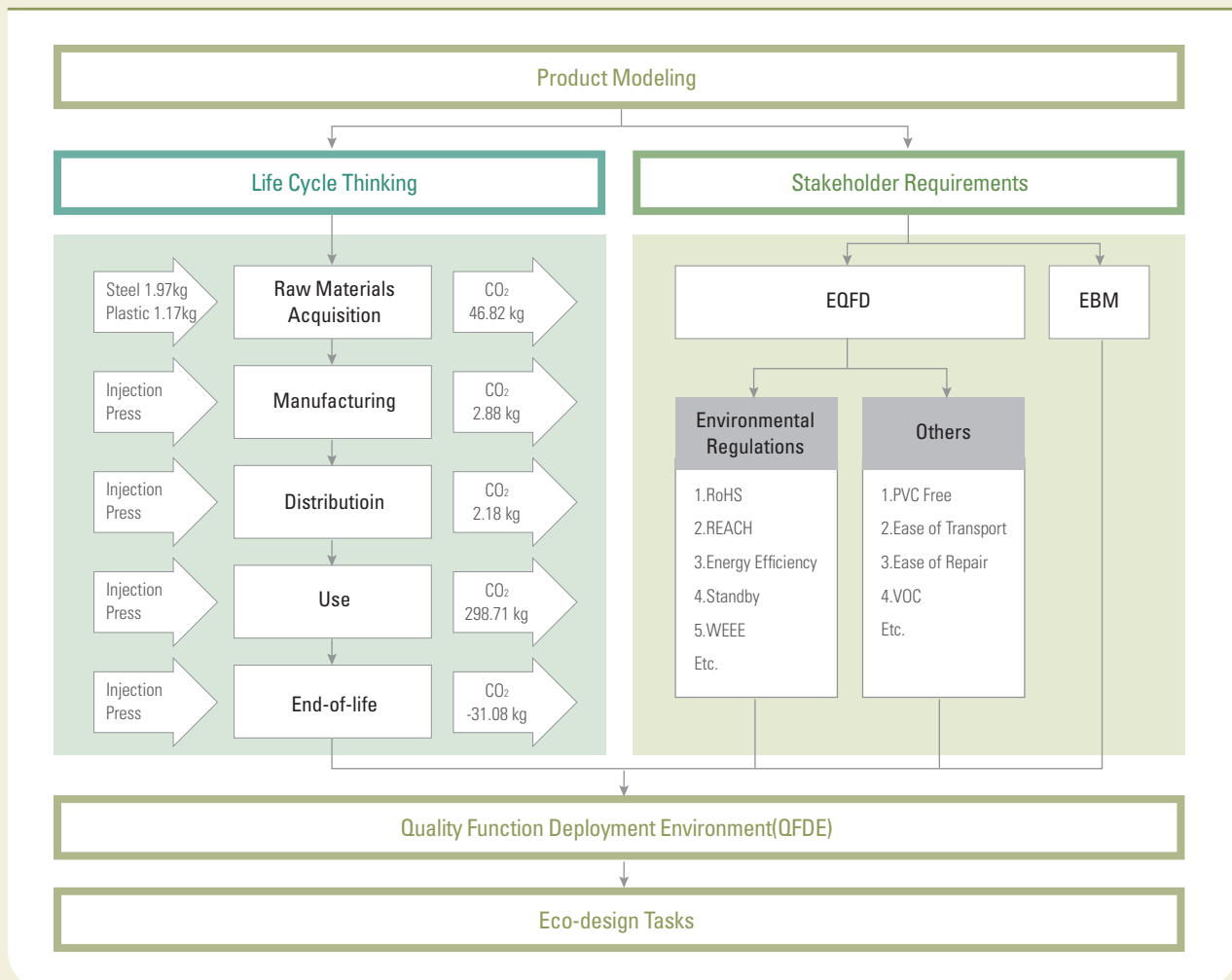


The environmental parameters that need to be improved through the above cannot be immediately applied to product design, since they are only indicative of the environmental performance of the product and do not provide specific information on which segments, components, materials and processes of the product call for improvement. It is therefore necessary to convert the identified environmental parameters into eco-design tasks.

A great number of approaches are available for this conversion. The most common method is selecting an eco-design improvement strategy and deriving the consequent eco-design tasks.

To summarize the phases described above, the eco-design process comprises product modeling; environmental analysis of a product using the LCT matrix; analysis of the stakeholder requirements using EQFD, EBM and QFDE; and derivation of strategies and tasks for eco-design improvement.

<Figure 2> Eco-design Process



The next step is to devise solutions for the implementation of the functions of the product, based on eco-design tasks. The tasks derived in the previous step are then integrated into the existing functions of the product. In details, solutions on the function of the product are identified, selected, and combined in order to come up with conceptual design of the product, leading to the completion of the eco-designed product.

2. Product Modeling

Modeling is the first step to come up with eco-design of a target product. Modeling here refers to the examination and documentation of every material, process and component, along with the distribution, use and end-of-life of the product throughout its life cycle.

Product modeling must be conducted in three distinct dimensions: the manufacturing process undertaken by the manufacturer, the processes applied by its partners and the consumption patterns of end consumers.

In the partners' processes, data on the components, materials and substances used to produce the manufacturer's product need to be collected. In this case, the BOM data of the products is used.

<Table 1> An example of BOM data for a target product.

No.	Item	Detail	Material
1	Metal housing	Top Case	PCM
2	Metal housing	Bottom	EGI
3	Metal housing	Rear Panel	EGI
4	Metal housing	Ethernet PCB Bracket	EGI
5	Plastic housing	Front Panel	ABS
6	Plastic housing	Door	ABS
7	Plastic housing	LED Cover	ABS
8	Plastic housing	Touch Panel	ABS
9	Plastic housing	Damp	ABS
10	Plastic housing	Damp Guide	ABS
11	Plastic housing	Window	ACRYL



12	Plastic housing	Half Mirror	PC
13	PCB assembly	Smart card PCB	PCB
14	PCB assembly	Main PCB	PCB
15	PCB assembly	LED PCB	PCB
16	PCB assembly	RS232 PCB	PCB
17	PCB assembly	Ethernet PCB	PCB
18	PCB assembly	Front PCB	PCB
19	PCB assembly	Touch PCB	PCB
20	Accessory	Thermal Pad	Silicon
21	Accessory	Insulator	ABS
22	SMPS	SMPS Cushion	EVA CUSHION
23	Accessory	Shaft	Steel
24	Accessory	Metal piece (3ea)	Steel
25	Accessory	Magnet (3ea)	Mg
26	Accessory	Finger Gasket	COPPER
27	Metal housing	Screw	Steel
28	PCB assembly	F/F cable	COPPER
29	PCB assembly		PVC
30	SMPS	SMPS	PCB
31	Accessory	Fan	ABS
32	Accessory		Cable
33	Accessory		Steel
34	HDD	HDD Bracket	EGL
35	HDD	HDD Rubber Cushion	EPDM Silicon
36	HDD	HDD Top Cover	Aluminum
37	HDD	HDD PCB	PCB

38	HDD	HDD Pointer Assembly Frame	Steel
39	HDD	HDD Pointer Assembly	Aluminum
40	HDD	HDD Circular Plate	Aluminum
41	HDD	HDD Circular Plate beneath the Plate	Aluminum
42	HDD	HDD Bottom Circular Plate	Aluminum
43	HDD	HDD Plastic Part	ABS
44	HDD	HDD Main Black Frame	Aluminum
45	HDD	HDD Hard Disk	Aluminum
46	HDD	HDD Torxs	Steel
47	Accessory	Remote Control Unit Case	ABS
48	Accessory	Remote Control Unit PCB	PCB
49	Accessory	Remote Control Unit Keypad	Rubber
50	Accessory	Remote Control Unit Spring	Steel
51	Packing Material	Gift Box	Paper
52	Packing Material	Accessory Box	Paper
53	Packing Material	Handle	PP
54	Packing Material	Handle Bracket	LDPE
55	Packing Material	Poly Bag	PE
56	Accessory	Loop Cable	COPPER
57	Accessory		PVC
58	Accessory	Power Cord Cable	COPPER
59	Accessory		PVC
60	Accessory	HDMI Cable	COPPER
61	Accessory		PVC
62	Accessory	USB Cable	COPPER
63	Accessory		PVC



As seen in the table listing BOM data above, a given product is composed of a great number of components, which in turn consist of a variety of materials. Of course, the product is not simply the combination of these components. Some (raw) materials, such as solder, may be used as in the form of a component of the product throughout the manufacturing process. Some process materials such as lubricant are not included as components of the product, but are instead used for manufacturing. In addition, energy, such as in the form of electricity or natural gas, is consumed in the process. It is required not only in the manufacturing process of the product, but in that for components and fittings as well.

For every component, information must be obtained regarding input materials for the process, energy and emissions, as well as the materials constituting the components, which means that input/output data should be collected. However, it is both impossible and unnecessary to collect data for all components on the BOM. The primary reason to undertake product modeling is to determine the components, processes and substances that may have a negative impact on the environment and to draw environmental parameters calling for their improvement. Therefore, those components, substances and processes that are not considered significant should be excluded from the process of collection. Here, it may be helpful to set standards—for example: if the amount of a substance or energy used in a process is less than N percent of the total amount, the unit process can be excluded; however, if significant factors such as harmful substances are involved in the unit process, it should be included within the product system—and use such standards to determine the boundaries of the product system.

In general, the input/output data collected at the component level include the types and weights of other components used during a certain component manufacturing phase; materials and energies used for the transport and manufacturing of these components; and the types and amounts of air and water contaminants and wastes generated during the manufacturing and transport process.

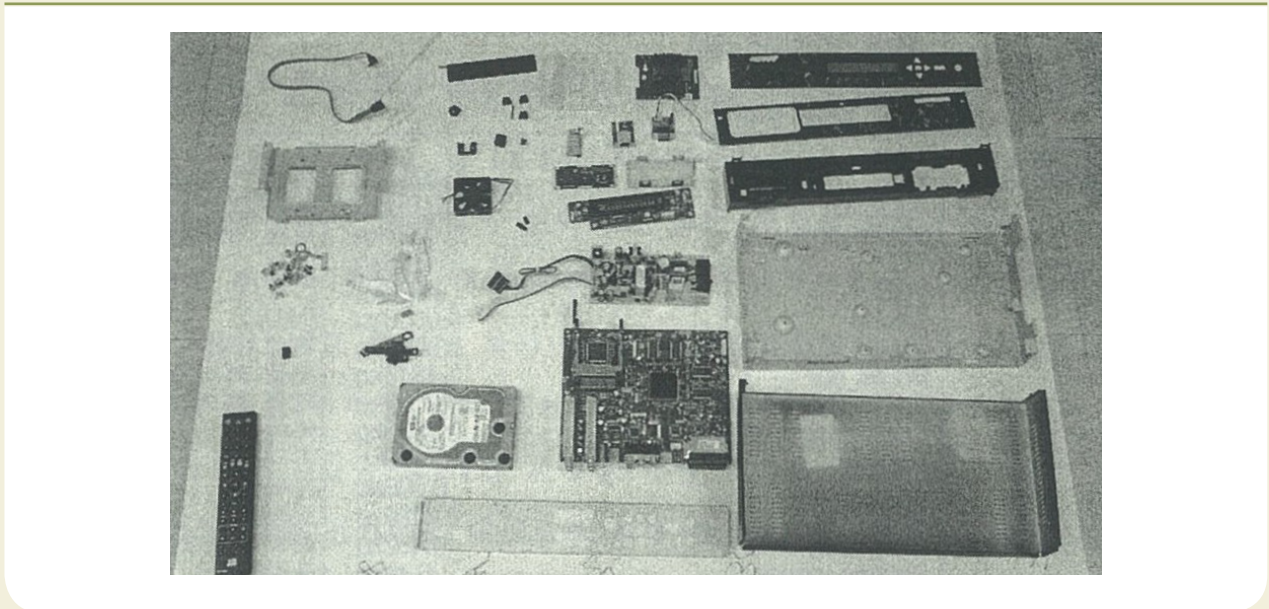
The next step is to collect input/output data about the product itself. The data items and the collection methods are the same as those applied in the case of components. Since the product, however, experiences distribution, use and end-of-life phases after manufacturing, input/output data should be collected during the downstream processes of the product, i.e. distribution, use and end-of-life phases.

Input/output data collection during the downstream processes should be preceded by the creation of a scenario for every activity involved in the phases of distribution, use and end-of-life. These scenarios need to be based on a presumption of realistic situations, in which case taking an objective viewpoint is most important. Data on every activity involved in each phase is collected: means and distance of transport in the distribution phase; hours of use of the product, the useful lifetime of the product, electricity consumption and the type and amount of materials consumed in the use phase; and collection of used products, treatment and final disposal in the end-of-life phase.

The procedures above are widely applied to craft a precise environmental analysis, i.e. an analysis using Life Cycle Assessment (LCA). If an environmental analysis is not conducted at the LCA level—i.e. when the environmental analysis of a product needs to be conducted over a brief period of time—more practical means, such as an LCT matrix, should be used.

To this end, the product is disassembled and then selected data, such as the weight and substances of major components, are measured and documented. <Figure 3> is a photograph of a disassembled product, and <Table 2> shows an example of the results of modeling the target product using environmental parameters.

<Figure 3> A Disassembled Complex Set-top Box



<Table 2> Result of Product Modeling for the Complex Set-top Box

Environmental Parameter	Data
General Information	
Name of product	Satellite Complex Set-top Box (HD 8000S)
Weight	3.3482 kg (including package)
Volume	420×115×316 mm
Lifetime	Five years (Mean Time to Failure, or MTTF, considered)
Function	Reception of satellite broadcasts



Raw Materials Acquisition																															
Raw Materials in Use	<table border="1"> <tr><td>EGI</td><td>0.9231 kg (case and others)</td></tr> <tr><td>ABS</td><td>0.2158 kg (case and others)</td></tr> <tr><td>Acrylonitrile</td><td>0.0095 kg (case and others)</td></tr> <tr><td>PC</td><td>0.06 kg</td></tr> <tr><td>PCB</td><td>0.836 kg</td></tr> <tr><td>Silicon</td><td>0.0008 kg (PAD)</td></tr> <tr><td>EVA</td><td>0.0003 kg (accessory)</td></tr> <tr><td>Brass bar</td><td>0.4813 kg(case and others)</td></tr> <tr><td>Electric steel deformed bars</td><td>0.0042 kg (case and others)</td></tr> <tr><td>Copper rod (8 mm)</td><td>0.0033 kg (cables)</td></tr> <tr><td>Billets</td><td>0.1103 kg (others)</td></tr> <tr><td>PVC</td><td>0.008 kg (cables)</td></tr> <tr><td>PBT</td><td>0.0229 kg (packaging material)</td></tr> <tr><td>Aluminum</td><td>0.452 kg (hard disk)</td></tr> <tr><td>Printing paper</td><td>0.44 kg (packaging material)</td></tr> </table>	EGI	0.9231 kg (case and others)	ABS	0.2158 kg (case and others)	Acrylonitrile	0.0095 kg (case and others)	PC	0.06 kg	PCB	0.836 kg	Silicon	0.0008 kg (PAD)	EVA	0.0003 kg (accessory)	Brass bar	0.4813 kg(case and others)	Electric steel deformed bars	0.0042 kg (case and others)	Copper rod (8 mm)	0.0033 kg (cables)	Billets	0.1103 kg (others)	PVC	0.008 kg (cables)	PBT	0.0229 kg (packaging material)	Aluminum	0.452 kg (hard disk)	Printing paper	0.44 kg (packaging material)
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Manufacturing Techniques	Injection molding, plating (nickel, gold), SMT (dipping, manual soldering), rolling and pressing (connector, terminal, etc.), washing, cutting, painting, bonding (label), printing, packaging, screw tightening																														
Waste Generation	Lead sludge, PVC scraps, paper scraps (package boxes), circuit components (resistance, condenser, connector, etc.), pin scraps																														
Packaging	Manila paper box (coated, disposable), vinyl package (PE), cardboard box (disposable)																														
Transport	Shipping: 20,100 km - marine transport (27,500 dwt container ship, Amsterdam) Trucking: 1,930 km - truck (23.1 – 25 tons)																														
Utility	On mode: 1.5 h/day Active standby mode: 22.5 h/day Off mode: 0 h/day																														
Energy Consumption	Five years of use Standby active mode: 4.02 Wh On mode: 20.7 Wh 221.7375 KWh consumed during the life cycle (24.72 Wh × 24 h × 5 years)																														
Joint	Screws																														
Disassembly Time	2 mins																														
Recyclability Rate	70%																														
Annual Sales Volume	100,000 ea/year																														

3. Analysis of a Product's Environmental Performance

The analysis of a product's environmental performance aims to ascertain the environmental parameters that will result in a negative impact on the environment over its life cycle. This chapter employs Life Cycle Thinking (LCT) for the analysis.

LCT refers to the consideration of every environmental aspect associated with a product and the entire system related to a product. In other words, applying LCT translates into examining all input materials and emissions for each phase of the product life cycle (from raw materials acquisition to end-of-life) and determining from among them which environmental aspects, or more specifically environmental parameters, will have a negative influence on the environment. These are the environmental parameters that need to be improved through the eco-design process. The LCT makes it possible to consider every environmental aspect of the product life cycle, and thus discern various aspects of the impacts that the product might have on the environment, by turning away from the traditional approach in which the improvement of environmental performance was focused on simply one specific stage of the life cycle or a particular environmental aspect (e.g. environmental emissions in the manufacturing phase or recycling in the end-of-life phase). Consequently, errors resulting from preconceptions can be prevented and it enables the identification of significant environmental parameters. Major elements of LCT include diverse viewpoints in the product design phase that are not biased towards a specific stage of the life cycle, the consideration of the product life cycle and the identification of significant environmental aspects.

The identification of the product's significant environmental aspects (or significant environmental parameters) may involve the use of the LCT matrix or LCA, both of which are based upon LCT. The former is a qualitative approach, and the latter a quantitative one. The EuP Directive does not directly mention LCA, but strongly recommends the LCT matrix, which is simple to use and requires no particular expertise. The use of the LCT matrix facilitates the identification of a product's significant environmental parameters, such as problematic substances and processes.

In the LCT matrix, the rows represent life cycle phases and the columns environmental aspects. The blank at the intersection of a row and column is filled with the corresponding environmental parameter and its value. Data is based on the result of product modeling, where the environmental parameters and their values are presented for each respective phase of the product life cycle. These data are restructured on the LCT matrix.

Next, the values for the environmental parameters are converted into a common unit of measurement. For example, one option is to convert them into units of Global Warming Potential (CO₂ eq.). In this case, the environmental impact of each substance can be calculated by referring to the LCI database in Korea. This conversion can be performed by multiplying the value of the environmental parameter by CO₂ eq. for each substance. (A detailed example can be found on p.43 of KEITI's 2009 Eco-design Process Application Manual for Each Product Family.) <Table 3> shows an example



of the result of environmental performance analysis using the LCT matrix and the conversion into CO₂ eq. for the target product.

<Table 3> Results of LCT for the Complex Set-top Box (partial)

	Raw Materials Acquisition			Manufacturing		
	Item	Value	kg CO ₂ eq.	Item	Value	kg CO ₂ eq.
Raw Materials	Electronic galvanized steel sheet	0.92	34.89	Electricity	5.00	2.48
	ABS	0.22	0.65	Press process	0.92	0.18
	Acrylonitrile	0.01	0.02	PVC injection molding	1.09	0.22
	PC	0.06	0.23			
	PCB	0.84	8.53			
	Silicon	0.001	0			
	EVA	0.0003	0			
	Brass bar	0.48	0.87			
	Billets	0.11	0.19			
	PVC	0.01	0.01			
	PBT	0.02	0.08			
	Aluminum billet A1050	0.45	0.75			
	Printing paper-containing waste paper over 50%	0.44	0.56			

4. Analysis of Stakeholder Requirements

Together with the legal regulations applied to a product, stakeholder requirements are environmental requirements that are demanded of a product by customers, environmental groups and certification standards. Here, the scope of stakeholders includes by definition end users of the product, business-to-business (B2B) customers, environment directives and regulations, standards, non-governmental organizations and competitors. The improvement of the

product's environmental performance requires the identification of legal conditions and stakeholder requirements and the conversion of these conditions and requirements into environmental parameters. This section introduces the method of analysis of stakeholder requirements regarding the product, such as the requirements of end users and B2B customers.

4.1 End users of the Product

End users of the product are interested in those features of the product, such as lifetime and ease of use, which are relevant to the use phase of the product. Therefore, the requirements of end users depend upon the functions and features of the product that are used by consumers.

4.2 B2B Requirements

This refers to requirements regarding the environmental performance of substances and components along the supply chain for the manufacturing of finished products. These requirements may include the presence and amount of harmful substances in the product, as well as its recyclability.

4.3 Relevant Laws

4.3.1. WEEE Directive

The Waste of Electrical and Electronic Equipment (WEEE) Directive requires distributors and manufacturers (producers) to collect electronic appliance waste at no charge, sets a reuse/recycling rate for each item, and permits sales within the EU region of only those products compliant with the directive. The WEEE directive applies to a total of ten product categories: large household appliances; small household appliances; IT and telecommunications equipment; consumer equipment; lighting equipment; electrical and electronic tools; toys, leisure and sports equipment; medical devices; monitoring and control equipment; and automatic dispensers.

4.3.2 RoHS Directive

The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (RoHS) limits the use of harmful substances in electrical and electronic appliances that may impede reusability during the disposal and reuse



of electrical and electronic appliance waste and result in environmental pollution. It makes it mandatory to replace such substances with less harmful ones. The restriction also limits the distribution and sales in the EU market of electrical and electronic products that entered the market from July 1, 2006 if the products contain any of six harmful substances, including lead, mercury and cadmium, in amounts exceeding the maximum allowable concentration levels.

The directive applies to eight of the ten categories in the WEEE Directive (large household appliances; small household appliances; IT and telecommunications equipment; consumer equipment; lighting equipment; electrical and electronic tools; toys, leisure and sports equipment; and automatic dispensers) as well as to incandescent lamps and household lighting, but not to products that entered the marketplace prior to July 1, 2006. The harmful substances subject to the regulations consist of lead, mercury, cadmium, hexavalent chromium, PBB and PBDE, and the maximum concentration values allowed by the restriction are 0.1% for cadmium and 0.01% for the other five substances.

4.3.3 EuP Directive

The Eco-design Requirements for Energy Using Product and Amending Council Directive (EuP), the EU legislation that serves as a basic framework for establishing eco-design requirements, entered into effect on August 11, 2005. Almost all electric and electronic products are subject to this directive, under which eco-design became mandatory.

4.3.4. REACH

Manufacturers of chemicals traded within the EU have the responsibility to assess the risk of materials. Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) is the EU's new comprehensive chemical management policy which requires manufacturers to register chemicals manufactured or used by them beyond a certain level and provide relevant information.

4.3.5 Energy Labeling

This system requires that the energy efficiency of energy-using products such as automobiles and electric/electronic appliances be evaluated and high-efficiency products be labeled or marked with their energy efficiency rating. The system is mostly operated by the government with legal grounds. In particular, since compulsory labeling is a governmental regulation, all products in designated categories are subject to the system. Energy labeling has the most extensive history among environmental labeling systems and its direct link to consumer spending leads to a high awareness of the system among consumers. As a result, even voluntary labeling tends to attract active participation from manufacturers.

4.3.6 Standby Power Warning Label System (or Energy Use Rationalization Act)

After its amendment, the operational regulations of this system were announced on March 13, 2008 with the purpose of promoting the development and dissemination of products with a capacity for reducing the consumption of standby power and facilitating the efficient use of energy as a means to promote the stabilization of energy supply and demand and ensure the rational use of energy. The system applies to energy-using products, such as adapters and set-top boxes. This warning system took effect from January 1, 2009 for adapters and from July 1, 2009 for set-top boxes. For set-top boxes, standby power consumption should be less than 10 W.

The analysis of the stakeholder requirements regarding the target product has yielded the conclusion that the specific requirements should include minimal weight, reduced power consumption, reduced harmful substances, fire hazard prevention design, consideration for recycling, compact size, ease of after-sales service, product tracking management and compliance with regulations.

5. *Derivation of Environmental Parameters*

It should be determined if stakeholder requirements need to be applied to the product, and if so, each relevant requirement should be identified. Analysis tools such as EQFD and EBM are used in this step to yield major environmental parameters. Section 5 presents the usage of each tool and an example case in which they are applied to the target product.

5.1 EQFD

Quality Function Deployment (QFD) is a methodology that identifies customers' needs based on their requirements and translates them into design parameters. Customers' demands, despite their abstraction, can be transformed into specificities applicable to product design by means of QFD. In other words, QFD is a technique for extracting from among multiple demands the major requirements that need to be reflected in product design and converting them into specific design parameters. EQFD, derived from QFD, is an approach that relates the stakeholder requirements with environmental parameters, such as the weight, lifetime and recycling rate of the product, and draw major environmental parameters that satisfy the stakeholder requirements.



To conduct EQFD, a process for setting relative importance among stakeholder requirements is required. To this end, in-house specialists establish the relative importance of each requirement from environmental stakeholders. <Table 4> shows an example of how this applies to the target product.

<Table 4> Relative Importance of Environmental Stakeholder Requirements for the Complex Set-top Box

Environmental Stakeholder Requirements	Importance	Reason
Minimal weight	2	Not important – Customers’ demand
Reduced power consumption	9	Very important – EuP
Reduction in harmful substances	9	Very important – RoHS, REACH, etc.
Fire prevention design	9	Very important – Demand for Flammability (Safety)
Consideration for recycling	6	Important – WEEE
Compact size	2	Not important - Customer demand
Ease of after-sales service	4	Important - Customer demand
Product tracking management	4	Important – Quality Assurance
Compliance with regulations (EMC, LVD)	5	Important – CE marking

Next, the factor of the relationship between stakeholder requirements and environmental parameters is identified by means of a matrix. Customers’ environmental requirements are placed in the rows of the matrix, and environmental parameters in the columns. For each row, the relationship factors are entered in the form of a score in the corresponding columns. The factor can be assigned from among 0, 1, 3 and 9, where 0 means “no relationship,” 1 “weak relationship,” 3 “medium relationship,” and 9 “strong relationship.”

A weighted value as a final output is obtained by multiplying the degree of importance to a customer and the relationship factor between the customer’s environmental requirement and the environmental parameter and then summing these values for each environmental parameter. Each such sum divided by the sum for all environmental parameters is presented in the form of percentage of importance for each of the parameters. Here, the percentage of importance for each parameter is the final one for the parameter. That is, an environmental parameter with a high percentage value is considered a significant parameter. An example case of EQFD for the target product is shown in <Table 5>.

<Table 5> EQFD Example for the Complex Set-top Box

	Importance	Weight	Volume	Number of components	Lifetime	Raw material	Problematic material	Manufacturing person-hours	Waste	Loadage	Energy consumption	Ease of recycling	Maintenance	Recycling rate	Raw material for recycling	Total
Minimal weight	2	9	9	9	0	1	0	3	1	9	3	1	3	3	0	
		18	18	18	0	2	0	6	2	18	6	2	6	6	0	
Reduced power consumption	9	0	1	9	3	0	0	0	0	0	9	0	0	0	0	
		0	9	81	27	0	0	0	0	0	81	0	0	0	0	
Reduction in harmful substances	9	0	0	1	1	1	9	0	9	0	0	9	0	9	1	
		0	0	9	9	9	81	0	81	0	0	81	0	81	9	
Fire hazard prevention	9	0	0	3	0	3	3	0	3	0	3	0	0	0	1	
		0	0	27	0	27	27	0	27	0	27	0	0	0	9	
Consideration for recycling	6	0	3	9	9	9	3	3	3	0	0	9	3	9	3	
		0	18	54	54	54	18	18	18	0	0	54	18	54	18	
Compact size	2	3	9	9	1	1	0	0	1	9	1	0	0	1	0	
		6	18	18	2	2	0	0	2	18	2	0	0	2	0	
Ease of after-sales service	4	0	3	3	0	0	0	0	0	1	1	9	9	9	0	
		0	12	12	0	0	0	0	0	4	4	36	36	36	0	
Product tracking management	4	0	0	1	0	0	0	3	0	3	1	0	1	1	1	
		0	0	4	0	0	0	12	0	12	4	0	4	4	4	
Compliance with regulations	5	0	0	0	0	0	9	0	0	0	0	3	0	3	0	
		0	0	0	0	0	45	0	0	0	0	15	0	15	0	
Total		24	75	223	92	94	171	36	130	52	124	173	64	183	40	1481
Weighted value		1.6	5.1	15.1	6.2	6.3	11.5	2.4	8.8	3.5	8.4	11.7	4.3	12.4	2.7	100



5.2 EBM

Environmental Benchmarking (EBM) is used with competitors' products or previous products from the manufacturer that are comparable to the target product. The practice of Benchmarking (BM) is widespread among companies, so EBM can be expected to be applied without difficulty. For each environmental parameter, the values for the manufacturer's product and a comparative one are entered. The weak points of the manufacturer's product compared with the other can be identified. The environmental parameters for the weak points are significant ones. <Table 6> shows the EBM result for the target product and <Table 7> the derived significant environmental parameters.

<Table 6> EBM Result for the Complex Set-top Box

Environmental parameter		HD 8000S (target product)	HDPV T12CX (comparison product)
Weight		3,848 g (including package) 3,390 g (excluding package)	3,066 g (including package) 2,596 g (excluding package)
Volume	Dimension	420×115×316 mm	350×115×336 mm
	Volume	1.59×107 mm ³	1.35×107 mm ³
Number of components (ea)		50	42
Lifetime (years)		5	5
Response time (sec)		35	35
Number of raw materials		15 kinds	16 kinds
Amount of problematic materials (kg)		0.21848	0.169
Manufacturing person-hours (min)		3	2.2
Amount of waste/harmful waste		1.174065	1.063215
Loadage (ea/ton)		294	411
Energy consumption (kwh)		602.25	567.757
Ease of reuse/recycling		Disassembly time: 2 min (screws are used)	Disassembly time: 1.5 min (screws are used)
Number of materials for maintenance		18	14
Recycling rate (%)		70	68
Recycled raw materials (kg)		2.719135	2.027885
Recycled components (ea)		0	0

<Table 7> Significant Environmental Parameters

	Weight (kg)	Volume	Number of components (ea)	Lifetime (years)	Response time (sec)	Number of raw materials (ea)	Amount of problematic materials	Manufacturing person-hours (min)	Amount of wastes (kg)
HD-8000S	3.80	15,939,000	50	5	35	15	0.219	3.0	1.17
HDPV-T12CX	3.06	13,524,000	42	5	35	16	0.169	2.2	1.06
Weighted value	1.5	4.8	14.2	5.8	1.7	6.0	10.9	2.3	8.3
HD-8000S	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
HDPV-T12CX	3.0	3.0	4.0	3.0	3.0	3.0	3.0	3.0	3.0
Final weighted value	0.00	0.00	-14.20	0.00	0.00	0.00	0.00	0.00	0.00

To sum, <Table 8> shows the significant environmental parameters extracted through environmental analyses using the LCT method and the EQFD and EBM approaches, as well as the detailed stakeholder requirements regarding the selection of eco-design parameters in need of improvement.

<Table 8> Selection of Significant Environmental Parameters and Stakeholder Requirements for the Complex Set-top box

Analysis tool	Significant environmental parameters	Stakeholder requirements	Selection
LCT	Reduction in energy consumption during the use phase	Reduction in power consumption	0
EQFD	Number of components in use	Compact size, minimal weight	0
	Amount of problematic materials	Compliance with regulations regarding harmful substances	0
	Amount of waste/harmful waste	Reduction in harmful substances	0
	Energy consumption	Reduction in power consumption	X (duplicated)
	Ease of reuse/recycling	Design with consideration for recycling, ease of after-sales service	X (duplicated)
	Recycling rate	Design with consideration for recycling, ease of after-sales service	0
EBM	Number of components in use	Compact size, minimal weight	X (duplicated)

6. Identification of Components in Need of Improvement

Next, the components in need of improvement are identified as a means to improve the significant environmental parameters. For this, the QFDE tool is used. QFDE is similar to EQFD in process, but differs in terms of output. The former yields as an output the components whose environmental performance needs to be improved, while the latter identifies the significant environmental parameters. EQFD uses only the step-one matrix from the four-step matrix used in QFD. In other words, it only uses the step-one matrix representing the relationship between environmental requirements and environmental parameters. QFDE, however, constructs a matrix to illuminate the relationship between the components and the significant environmental parameters identified in step 1, and reveals which components require environmental improvement.

The QFDE method considers the environmental requirements and the environmental characteristics of the product. In step 1, environmental parameters and environmental requirements are placed in rows and columns, respectively, and then a calculation is conducted. In step 2, the significant environmental parameters determined through step 1 and the components of the product are placed in columns and rows, respectively, and a calculation is then made. The matrix calculation method is the same as in EQFD.

The steps above yield the components to be improved. <Table 9> shows the QFDE result for the target product.

<Table 9> The QFDE Result of the Complex Set-top Box

QFDE Step 2	Weighted value	Metal housing	Plastic housing	PCB Ass'y	SMPS	HDD	Packing material	Accessory	Total
Number of components in use	26.3	1	1	9	9	9	1	3	33
		26.3	26.3	236.7	236.7	236.7	26.3	78.9	867.9
Amount of problematic materials	20.4	0	1	9	9	9	3	3	34
		0	20.4	183.6	183.6	183.6	61.2	61.2	693.6
Recycling rate	23.3	9	9	1	1	3	1	1	25
		209.7	209.7	23.3	23.3	69.9	23.3	23.3	582.5
Total	-	236	256.4	443.6	443.6	490.2	110.8	163.4	1869.8
Weighted value	-	12.6	13.7	23.7	23.7	26.2	5.9	8.7	-

The QFDE method allows the identification of the components that require improvement, the placement of those components in an inverse of the step-1 and step-2 matrices, and the evaluation of the degree of conformity to initial environmental requirements.

7. Planning of Eco-design Strategy and Tasks

The processes above identify significant environmental aspects and components, which in turn yield eco-design tasks. The consideration of the functions of each task results in solutions, some of which can be used for environmental improvement of the components. One advantage of the QFDE approach is that companies can apply the method with ease since it omits extended processes and instead focuses directly on the identification of those components in need of improvement. <Table 10> shows how an eco-design strategy, goal and solution for each component in need of improvement are identified. This can be undertaken through a meeting of in-house specialists featuring the use of expert brainstorming.

<Table 10> Eco-design Strategy, Goal and Solution for the Components in Need of Improvement

Environmental parameter	Eco-design strategy	Eco-design task	Function	Component to be improved	Solution
Reduction in energy consumption during the use phase	Reduction in energy consumption during the product's operation	Reduction in power consumption	Reduction in energy consumption	SMPS	Preferential selection of efficient components
				HDD	
Number of components in use	Reduction in components in use	Reduction in the number of components for PCB assembly	Reduction in the number of mounted components	PCB Assembly	Efficient design of PCB
		Option to detach HDD	Ability to remove HDD from the product	HDD	Status quo
Amount of problematic materials	Reduction in the amount of problematic materials	Reduction in harmful substances in the product	Reduction in the use of PVC in cables	None	None
Amount of waste	Reduction in waste/harmful waste	None	None	None	None
Recycling rate	Improvement of ease of recycling	Ease of disassembly during the disposal	Marking of substances	HDD	Marking of substances, such as packaging materials



8. Conclusion

Among the solutions above, design alternatives conducive to immediate application to the target product are selected. Based on these choices, environmental improvement is assessed through a comparison with existing products, the design is reviewed, and the degree of environmental improvement is identified. Finally, the eco-designed product is completed.