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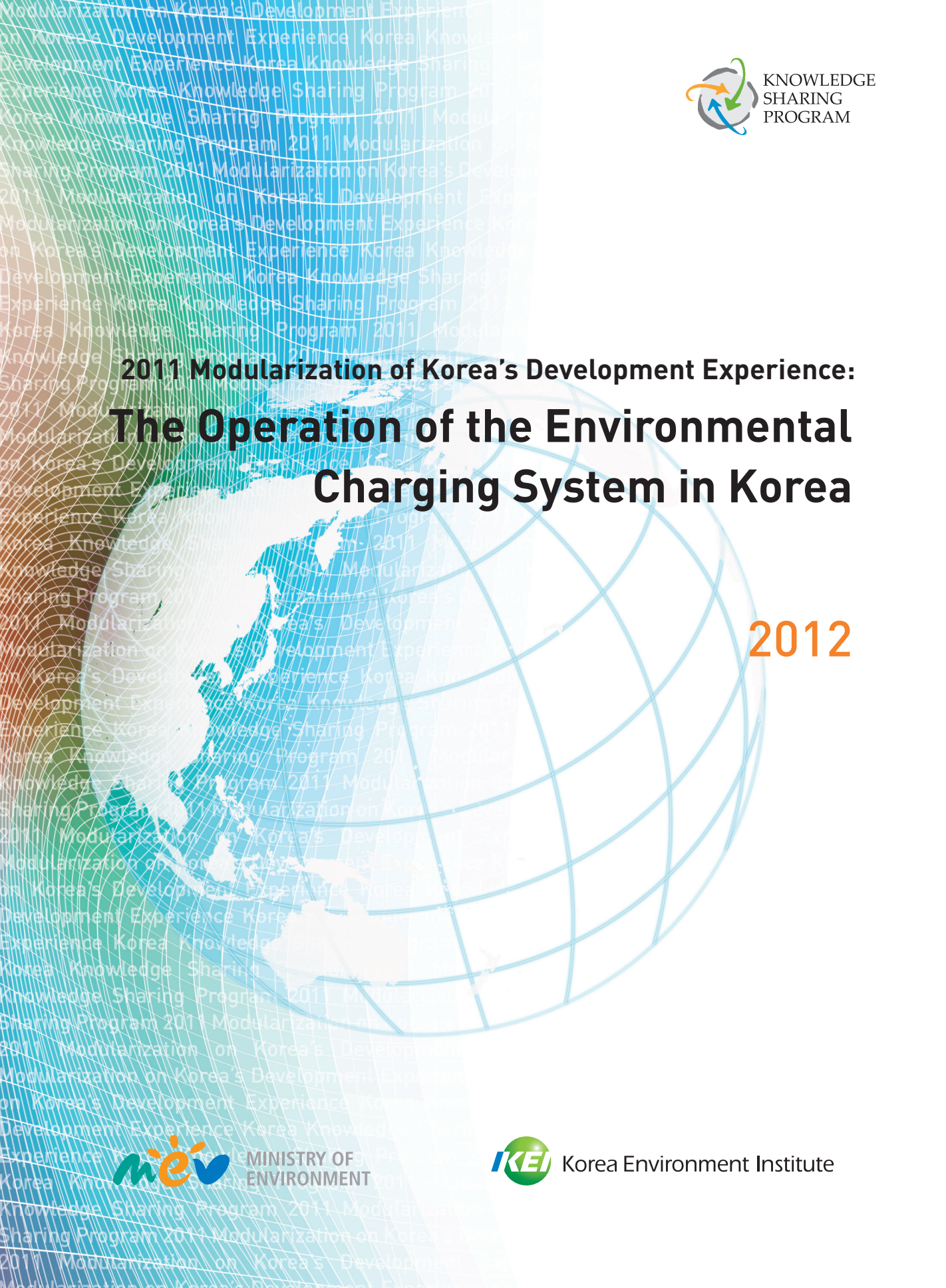
2011 Modularization of Korea's Development Experience:

The Operation of the Environmental Charging System in Korea

2012



MINISTRY OF ENVIRONMENT

Korea Environment Institute

2011 Modularization of Korea's Development Experience:

The Operation of the Environmental Charging System in Korea

2011 Modularization of Korea's Development Experience

The Operation of the Environmental Charging System in Korea

Title	The Operation of the Environmental Charging System in Korea
Supervised by	Ministry of Environment (ME), Republic of Korea
Prepared by	Korea Environment Institute (KEI)
Author	Man Ok Kang, Korea Environment Institute
Advisory	Byung-In Lim, Professor, Chungbuk National University
Consultants	Hae Inn Heo, Assistant Junior Official, Environmental Industry Team (ME) Ji Hae Lee, Action Officer, Environmental Industry Team (ME) Myung Hun Cho, Officer Director, Youngsan River Environmental Management (ME) Young Sung Yu, Senior Research Fellow, Gyeonggi Research Institute Moon Suk Chang, Section Chief, EPR Operation Team, Korea Environment Corporation
Research Management	Korea Development Institute (KDI) School of Public Policy and Management
Supported by	Ministry of Strategy and Finance (MOSF), Republic of Korea

Government Publications Registration Number 11-1051000-000236-01

ISBN 978-89-93695-80-9 94320

ISBN 978-89-93695-27-4 [SET 40]

KNOWLEDGE SHARING PROGRAM

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Preface

The study of Korea's economic and social transformation offers a unique opportunity to better understand the factors that drive development. Within one generation, Korea had transformed itself from a poor agrarian society to a modern industrial nation, a feat never seen before. What makes Korea's experience so unique is that its rapid economic development was relatively broad-based, meaning that the fruits of Korea's rapid growth were shared by many. The challenge of course is unlocking the secrets behind Korea's rapid and broad-based development, which can offer invaluable insights and lessons and knowledge that can be shared with the rest of the international community.

Recognizing this, the Korean Ministry of Strategy and Finance (MOSF) and the Korea Development Institute (KDI) launched the Knowledge Sharing Program (KSP) in 2004 to share Korea's development experience and to assist its developing country partners. The body of work presented in this volume is part of a greater initiative launched in 2007 to systemically research and document Korea's development experience and to deliver standardized content as case studies. The goal of this undertaking is to offer a deeper and wider understanding of Korea's development experience with the hope that Korea's past can offer lessons for developing countries in search of sustainable and broad-based development. This is a continuation of a multi-year undertaking to study and document Korea's development experience, and it builds on the 20 case studies completed in 2010. Here, we present 40 new studies that explore various development-oriented themes such as industrialization, energy, human capital development, government administration, Information and Communication Technology (ICT), agricultural development, land development and environment.

In presenting these new studies, I would like to take this opportunity to express my gratitude to all those involved in this great undertaking. It was through their hard work and commitment that made this possible. Foremost, I would like to thank the Ministry of Strategy and Finance for their encouragement and full support of this project. I especially would like to thank the KSP Executive Committee, composed of related ministries/departments, and the various Korean research institutes, for their involvement and the invaluable role they played in bringing this project together. I would also like to thank all the former public officials and senior practitioners for lending their time and keen insights and expertise in preparation of the case studies.

Indeed, the successful completion of the case studies was made possible by the dedication of the researchers from the public sector and academia involved in conducting the studies, which I believe will go a long way in advancing knowledge on not only Korea's own development but also development in general. Lastly, I would like to express my gratitude to Professor Joon-Kyung Kim for his stewardship of this enterprise, and to his team including Professor Jin Park at the KDI School of Public Policy and Management, for their hard work and dedication in successfully managing and completing this project.

As always, the views and opinions expressed by the authors in the body of work presented here do not necessary represent those of KDI School of Public Policy and Management.

May 2012

Oh-Seok Hyun

President

KDI School of Public Policy and Management

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Summary

Compared to the advanced nations where industry is well developed, developing nations have serious environmental pollutions but have weak administrative bases to execute environmental policies in order to improve the situation. Developing nations usually possess abundant natural environments, but air and water quality is deteriorating and the generation of wastes is increasing in the process of economic development, thus facing serious environmental pollutions. Due to people's poor environmental awareness and the government's policy of prioritizing economic development, it is difficult to implement policies to improve environment.

In Korea, problem of environmental pollution was serious in the process of economic development. Much financial investment was needed to solve the problem of environmental pollutions such as air pollution, water pollution, waste and so forth; however, related financial source was not enough. Therefore, various environmental charging systems were introduced based on the principle of charging on polluters and benefiters being conducted in advanced nations and necessary financial sources were prepared to improve the environment and invest in the basic environmental facilities. It is evaluated to be very successful systems.

In Korea, for various environmental mediums such as air, water, waste and so forth, 23 environmental charging systems are introduced and operated. The purpose of emission charging system is to improve the quality of air and water, and charges are imposed on air and water pollutants. It is operated by the principle of charging on polluters. In the environment improvement charging system, charges are also imposed for air and water pollutants. However, the purpose of the policy is to reduce the amount of air and water pollutants generated by diesel vehicles and facilities. In the Extended Producer Responsibility (EPR), recycle charges are imposed for wastes and it is introduced to encourage the recycling of wastes by producers.

As a result of evaluating Korea's major environmental charging systems in the categories of originality of the system, effect of environmental improvement, function of financial supply and the success of system operation and evaluating the possibility of applying to developing nations, emission charging system (air, water quality), environmental improvement charging system and Extended Producer Responsibility (EPR) were evaluated as environmental charging systems that can be applied to developing nations in the future.

Concrete application methods are as follows. First, it is necessary to impose charges with rates appropriate to the context of developing nations and encourage corporations' autonomous pollution control and the innovation of technologies to reduce environmental pollutions. While introducing air and water quality improvement charging system, gradual increase of charging rate can be considered. In addition, the method to provide incentives to the corporations that promote environment-friendly technological development through the tax revenue from the environmental improvement charging system can be considered. Wisdom is required to receive people's opinions and reflect them on policies while gradually expanding imposition objects and selecting reduction objects. As developing nations have many poor corporations, it must be executed gradually in the beginning by states that are appropriate to the situation of each nation.

Second, tax revenue is created when environmental charging system is introduced and operated and the financial resource needs to be used by deciding priorities. In the case of developing nations, there must be not many environmental base facilities (air and water process facility, landfill, incineration plant and so forth) and thus new constructions can be considered. Emission charging system can be introduced in the area of manufacturing industry in developing nations and financial resources can be used to reduce air and water pollutants and support the corporations' investment in prevention facilities. Collected emission charges can be used as the financial source of the environmental pollution prevention fund for long-term and low interest loan for corporations' investment in prevention facilities or they can be used for financial investment in the environmental base facilities such as air, water quality and so forth. In case of environmental improvement charging system, more various charging objects can be considered when applied to developing nations so that the financial resource for environmental investment can be prepared. The imposed environmental improvement charges can be used for supporting sewer system arrangement cost, sewage process plant, livestock waste process plant, high quality water process facility construction cost, environmental base facility operation cost and so forth. In addition, the financial resource can be used to support environmental pollution prevention project cost, environmental science and technology development cost, environmental policy research and development cost and so forth. In case of introducing and operating EPR system, the financial resource can be used for waste recycling facilities, waste recollection process facilities and so forth and investment fund needs to be used for raising the recycling industry.

Third, in order to respond to the problem of climate change, which is an international issue, the introduction of carbon tax and emission right trade system is being discussed in

developing nations along with the operation of environmental charging system. Therefore, the policy of carbon tax and emission right trade system that will be introduced in the future must be discussed. In case of developing nations, urban pollution is intensifying due to diesel vehicles just like Korea in 1990s; a certain amount of environmental charge can be imposed on the owner of diesel vehicle annually or on fuel price. In this case, the best way is to impose a certain amount on fuel but the next best way is to impose on cars (according to cc). It needs to be applied according to the situation of each nation.

Fourth, Korea is experiencing difficulties in imposing environmental improvement charges at the moment because of too many impositions are in place compared to the imposition cost; small imposition cost and lack of effective management concerning delayed payment are becoming problematic. When applying environmental improvement charges to developing nations, long-term installment payment, recalculation of rate and so forth must be considered based on our past experience so that distortions won't happen in the operational process. In addition, confusion in the system can be reduced by making the imposition subject clear. For example, local governing body or central government can take charge.

Fifth, if developing nations introduce EPR just like Korea, they can enhance recycling rate and contribute to the development of recycle industry at the same time. For the EPR system, as developing nations do not have enough separate emission infrastructure and manpower, it will be difficult to conduct separate emission directly. Therefore, it is desirable to conduct full EPR system after having recollection infrastructure and system for recycling items. In developing nations, it is proper to set low recycling responsible rate and increase the rate gradually when introducing RPR system. The most important thing is that the system can be established and operated successfully when recollection system is well established and prepared. In other words, recycling is possible when recollection of recycling items is conducted smoothly. In the civilian sector, in the aspect of autonomous participation, EPR system can be applied in developing nations if there are good recollection and process infrastructures.

Various limitations follow until a nation's system is properly introduced and established successfully, the will of the authority is important more than anything else. In conclusion, it is proper to introduce and operate the environmental charging system to fit the context of developing nations and to introduce and operate water quality and air quality improvement charging system and EPR system gradually in stages.

Chapter 1

Background for the Introduction of Environmental Charging System

1. Rise of Environmental Problem
2. Arrangement of Major Laws for Implementing the Environmental Charging System
3. Change of Budget System in the Field of Environment
4. Overview of the Environmental Charging System in Korea

Background for the Introduction of Environmental Charging System

1. Rise of Environmental Problem

Public Nuisance Removal Act was established in 1964 to solve the problem of environmental pollution, but environmental problems observed in advanced nations slowly appeared. As national income increased and industrialization accelerated, urban waste and harmful industrial waste increased rapidly. Even if the government and local governing bodies tried to make investment to build waste process facilities such as waste landfill and so forth, however, the local resident protested violently and the building of the process facilities were delayed. Moreover, new environmental problems appeared such as heavy metal contamination in the soil near wasted metal mine, acid rain, water bloom, red tide, asbestos pollution, contamination of small streams from livestock waste water and so forth. Then phenol contamination of Nakdong River in 1991 and offensive odor of Nakdong River tap water in 1994 brought the awareness of environmental problems in Korea and damaged the people's trust in the government's environmental policy.

From 1960s to 1980s in Korea, 5 year economic and social development plan were conducted 6 times and the economy experienced more than 7% annual growth. In addition, 86 Asian Games and 88 Olympic Games were held successfully and Korea joined OECD in 1996. Therefore, people's expectation was heightened about becoming an advanced nation. Rather than being aware of environment and damages by pollution, people tend to pursue pleasant environment that guarantee the quality of life. Such trend is significant in the people's tendency to select residential areas. The number of civil organizations registered at the Ministry of Environment in 1995 was 204. Many civil organizations appeared during this period, and these organizations conducted various activities to enhance people's environmental awareness. Especially, civil organizations conducted various activities concerning the problem of water contamination due to the building of dike at Siwha Lake,

building of dam at Dong River in Youngwal, the environmental effect by the reclamation of Saemangum and so forth and affect the society in many ways.

Showing such change of awareness, 5.7% answered in 1982 that environmental problem is important but it was increased to 22.7% in 1997. The rank of the environmental problem also rose, and it became the most important problem in 1997. <Table 1-1> shows that 17.2% answered in 1882 environmental problem is very serious but it was increased to 42.2% indicating that most people are aware of the seriousness of the environmental problem.

Table 1-1 | Change of Environmental Awareness (1982~1997)

Year	Importance and Rank of the Problem		Seriousness of the Problem (%)	
	Environmental Problem (%)	Rank	Very Serious	Very Serious + Serious
1982	5.7	7/14	17.2	71.4
1987	17.1	3/9	-	-
1990	20.8	2/7	15.6	77.2
1992	-	-	27.3	75.6
1996	33.1	1/6	37.5	90.6
1997	22.7	1/7	42.2	94.2

Data: Ministry of Environment

Accordingly, the government's tools to deal with environmental problems also changes along with the change of people's environmental awareness. In 1980s, the environmental contamination acts by emission facilities were directly regulated through administrative supervision and restriction. In 1990s, however, on the base that excessive restriction on industrial area can lower the nation's international competitiveness, overall reexamination was conducted in the area of environment about unnecessary direct restrictions. According to such policy of the government, restrictions were relieved but preventational environmental management tools such as environmental charging system and economic guidance tools were selected and implemented intensively.

2. Arrangement of Major Laws for Implementing the Environmental Charging System

After 1980s when reduction of living pollution and industrial pollution were the major goal in the environmental policy, our environmental policy was shifted to advanced nation type policy that deals with the environmental problems such as safe handling of waste, management of chemical materials and so forth in 1990s. As a part of the international

community, Korea began to participate in the international discussion about the protection of the global environment actively and reinforced the environmental laws and standards to the level of advanced nations according to the globalization trend of the environmental policy. The environmental policy focused on the establishment of environment-friendly production and consumption structure, environmental hygiene and the protection and natural ecology. In addition, predictive environmental administrations were conducted in order to prepare for the 21st century, which to pursue continuous growth.

2.1 Rearrangement of the Environmental Law System and Advancement of the Environmental Management System

From 1960s when Korea was not developed to the middle of 1970s when the effect of the economic development appeared, the domestic industrial acts were slow. Therefore, no serious environmental problems appeared and people did not feel the need for environmental law. Then the Public Nuisance Removal Act passed. With the Environmental Protection Law established in 1977 to replace the Public Nuisance Removal Act, the problems of air pollution and water pollution were dealt with and environmental management administration was conducted until 1980s. In 1990s, however, it was impossible to have only the Environmental Protection Law to manage the environment in the industrial and high consumption society. In the international community, global efforts were being made to protect the environment through various international agreements and new legal demands were created accordingly. According to such demands, more professional and technical legal responses were needed and environmental law system changed exclusively. Then the most active legislation activity started in the area of environment in 30 years of environmental history.

2.2 Classification of the Environmental Protection Law

The former Environmental Protection Law set out both regulations and concrete executions and defined many different areas such as air, water, soil, industrial waste, noise, vibration and even environmental damage conflict by a single law. Therefore, revisions had to be made with constant social changes. Because of such problems, the Ministry of Environment chose multiple legislations in the late 1980s instead of a single legislation and prepared the environmental law improvement plan that classified environmental protection laws according to environmental mediums such as air and water, area of environmental management and the characteristic of environmental management. Environmental bill was submitted to the parliament to classify the existing environmental protection law into 6 laws including Framework Act on Environmental Policy, Clean Air Conservation Act, Noise and Vibration Control Act, Water Quality Conservation Act, Toxic Chemicals Control Act and Environmental Pollution Damage Dispute Medication Act. These environmental laws were not passed in the government of the 5th and 6th republic but were finally passed in August

of 1990. Then separate laws began to take effect and environmental management could be executed in more professional ways.

2.3 Preservation of Natural Environment and Arrangement of Environmental Evaluation Related Law

Regulations about the management of natural environment were partly defined by the former Environmental Protection Law. After the Environmental Protection Law was divided, National Environment Conservation Act was established in 1991. In 1993, the environmental effect evaluation related regulations defined in Framework Act on Environmental Policy were separated and Environmental Impact Assessment Act was established. According to the policy of integrated operation of similar impact evaluation systems among government departments in 1999, however, this law was changed to Act on Assessment of Impacts of Works on Environment, Traffic, Disasters, Etc. that integrates and defines the impact evaluations related to other departments. The same law limited similar systems into a single law but the implement of the evaluation system was conducted separately. Therefore, in 2008, Environmental Impact Assessment Act that only governs the environmental impact evaluation was returned. On the other hand, Soil Environment Conservation Act was established in 1995 and Special Act on Ecosystem Preservation in Island Areas including Dokdo Island was established in 1997.

2.4 Arrangement of Water Quality Conservation Related Laws

In 1991 and 1995 when Nakdong River was contaminated, social concern increased about safe and stable management of drinking water and the government began to arrange the water management system that had been a political assignment for a long time. Tap water law and sewer system law were established in 1994 and the management of local water supply and the installation and management of sewer system were transferred from the Ministry of Construction and Transportation to the Ministry of Environment. In 1995, management of drinking water act was established and the drinking water related regulation governed by both food sanitation act and public health act were defined by a single law. Act on the Disposal of Sewage, Excreta and Livestock Wastewater was established in 1991 and the matters related to the management of sewage, excreta and livestock wastewater that had been governed by waste control act began to be managed separately. In 1997, Water Quality Control and Lakes and Marshes Act were established for prevention of water bloom. In 1999, Act on the Improvement of Water Quality and Support for Residents of the Riverhead of the Han River System, for the collection of water use charges and securing of environmental base facilities in Han River, was newly established. In 2002, similar laws were established for Geum River, Nakdong River and Youngsan River.

2.5 Arrangement of Waste Related Laws

In 1990s, safe processing of waste became a new assignment and many law related to waste management were established or revised. In September of 1991, Waste Control Act was revised in full scale. In this revised law, the classification of wastes were renewed and the management responsibility of the country and local governing body was made clear and the deposit system for waste recollection cost and post management system for waste landfill were introduced. In December 1992, in order to promote the recycling of waste and find a solution to the problem of waste, recycling related regulations on waste management law were separated. In addition, Act on the Promotion of Saving and Recycling of Resources that Contain the execution of Reinforced Content was established. In January of 1995, Promotion of Installation of Waste Disposal Facilities and Assistance Etc. to Adjacent Areas Act was established for the smooth installation of waste process facilities such as incineration plant, landfill and so forth. In 1993, synthetic resin waste process act for the collection and process of waste vinyl in rural areas was abolished and instead Korea Resources Recovery and Reutilization Corporation Act was established.

2.6 Legal Arrangement for Domestic Execution of International Agreement

In 1990, as Korea actively joined the international environmental agreements, domestic laws were established or revised to execute these agreements. In order to execute Basel Agreement that intended to regulate the movement and handling of harmful wastes among nations, Act on the Control of Trans-boundary Movement of Hazardous Wastes and Their Disposal was established in December of 1992. In 1994, Natural Environment Conservation Act was established in order to handle the agreement about international trade of endangered species (CITES, 1993) and convention on biological diversity. In 1999, Conservation of Wetland Act was established to reflect the spirit of the Ramsar Convention for protecting wetland and migratory birds.

2.7 Arrangement of Other Laws

In March of 1991, as a part of post measures after the Phenol contamination in Nakdong River and to punish the acts of damaging public life by emitting environmental pollutants as environmental crime, Act on Specific Measures for the Punishment of Environmental Offenses was established. In order to apply the principle of charging on polluters and to raise the investment fund, Environment Improvement Expenses Liability Act was established in 1991. In 1994, Act on Special Accounts for Environmental Improvement was established to expand environmental investment and manage investment fund more efficiently such as using the various charges on polluters including environmental improvement charges, emission charges, waste charges and so forth as the financial source for environmental investment. The environmental law system became more professional as Development of

and Support for Environmental Technology Act was established in 1994 and Indoor Air Quality Control in Public Use Facilities etc. Act was established in 1996.

3. Change of Budget System in the Field of Environment

3.1 Special Accounts for Environmental Improvement

Before the introduction of the Special Accounts for Environmental Improvement, major financial resources for the environmental investment besides general accounts included the waste management fund introduced by the Act on the Promotion of Saving and Recycling of Resources established in 1992 and the environmental contamination prevention fund introduced by the Environmental Protection Act and transferred to the Environmental Management Corporation Act in 1993. Waste management fund was raised by waste deposits and charges and was used for the investment necessary for the recycling and proper processing of waste. In addition, the environment contamination protection fund was raised by the environment improvement charges from the Environment Improvement Expenses Liability Act established in 1991 and emission charges from separate laws and was used for the execution of environmental improvement projects. With the promotion to the Department of Environment in 1990 and the establishment and execution of the environmental improvement mid-term general plan per 5 years for the securing of environmental base facilities, the demand for the environmental investment increased significantly. In order to secure new financial resources, therefore, Environment Improvement Expenses Liability Act was established in 1991 and environmental improvement charging system was introduced. On the other hand, introduction of a new account system was necessary and Act on Special Accounts for Environmental Improvement was established in 1994. Then special accounts for environmental improvement system were introduced from January 1st, 1995.

The waste management fund, which belonged to government fund, and the environmental contamination prevention fund, which belonged to private fund, were managed and operated under different systems and thus the operation of environmental investment funds was not systematic. Therefore, various charges on polluters and general account transferred funds were integrated as a single account system. The tax revenue of the special accounts for environmental improvement consisted of general account, transferred funds from other accounts, various charges on polluters and other loan principal and interest, repayments and so forth. Environmental charges on polluters included environmental improvement charges, emission charges, waste deposits and charges and water quality improvement charges. For the general account transferred fund, the general account supported the shortage of the environmental investment budget. With the new establishment of transportation tax in the special accounts for environmental improvement, a certain amount in the transportation tax was transferred into the special accounts for environmental improvement. Then from 2007, 15% of the traffic, energy and environment tax was transferred to the general account of

the budget governed by the Ministry of Environment and stable financial operation of the special accounts for environmental improvement became possible.

With the introduction and execution of such new account system, investment funds could be operated comprehensively according to the investment priorities of the environmental improvement projects and new financial sources such as general account and transferred fund from other sources were also secured. One notable thing is that the cost without encumbrance under the special account system could be included in the objects of transference and flexible budget arrangement and execution were possible in multiple years by reducing the transference conditions. For long-term projects such as building waste water process plant, river arrangement project and so forth, effective budget expenditure was difficult under the single year budget arrangement system. Under the special accounts for environmental improvement, however, multi-year projects were possible.

3.2 Tax Revenue Budget of Special Accounts for Environmental Improvement

The tax revenue in 1980s depended on general accounts before the introduction of special accounts for environmental improvement in 1995. With the implementation of the special accounts for environmental improvement, the waste management fund and the environmental contamination prevention fund that had been introduced to secure the financial resources for environmental investment were integrated and the budget for the environmental investment could be distributed and managed according to the investment priorities. The tax revenue budget of the Ministry of Environment in 1995 which was arranged for the first time by a new account system was 253.2 billion won in special account revenue and 166 billion won in general account transfer.

The financial sources for the special accounts for environmental improvement were originally environmental improvement charges, emission charges and waste deposits and charges. With the increase of charging on polluters, 7 charges are secured as of 2008 including the environment improvement charges. Beside these charges, there are loan repayment principal, income replacement cost and so forth and the total amount is more than 1,300 billion won.

The dependence rate on general account was about 40% in 1995 but it reached 58% in 2008. It shows the income from the charges in polluters is not catching up with the massive investment for the construction of environmental base facilities. In the tax revenue budget in 2008, the tax revenue source in the environmental budget included the tax revenue of the special accounts for environmental improvement and the general account transferred fund, which is 15% of the traffic, energy and environment tax. Self tax revenue consists of 7 charges including environmental improvement charges, emission charges, waste charges, waste deposits, recycling charges, water quality improvement charges and ecosystem preservation cooperation charges. There are also loan repayments and other tax

revenues. The total amount from the 7 charges is 848.5 billion won. The tax revenue from loan repayments is 353.8 billion won, and the general account transferred fund is 1,805.3 billion won.

The budget of the Ministry of Environment has several accounts including special accounts for environmental improvement, special accounts for financial investment and loan (integrated with public capital management fund from 2007), special accounts for management of the special tax for rural development (integrated with special accounts for the structural improvement of agricultural and fishing villages in 2007), special accounts for the management of state property (terminated as the general research complex was completed in 2003) and special accounts for balanced national development (arranged and started in 2005 with the abolishment of local grant) and tax expenditure budget by other accounts were arranged as the budget governed by the Ministry of Environment. In 2008, the special accounts for environmental improvement occupy 3,115.9 billion won (86.8%). The special accounts for balanced national development have 349 billion won and the special accounts for the structural improvement of agricultural and fishing villages have 100.6 billion won.

Table 1-2 | Content of Annual Tax Revenue Budget of the Special Account for Environmental Improvement

(Unit: 0.1 Billion Won)

Category	1995	1997	2000	2003	2006	2008
Total	**4,194**	**7,921**	**10,505**	**12,241**	**26,326**	**31,160**
Self Income (%)	2,533 (60%)	4,631 (58%)	6,152 (59%)	8,205 (67%)	10,849 (41%)	13,107 (42%)
Environmental Improvement Charges	976	2,217	3,566	4,978	6,331	6,462
Emission Charges	172	422	507	181	147	138
Waste Deposits	427	633	440	4	2	2
Waste Charges	249	584	514	572	489	552
Recycling Charges	-	-	-	-	45	44
Water Quality Improvement Charges	-	256	157	161	155	212
Ecosystem Preservation Cooperation Charges	-	-	-	64	352	1,075
Loan Principal	398	466	821	1,743	1,684	3,638
Others	311	53	148	293	1,644	983
Transferred Money, Loan Payable (%)	1,661 (40%)	3,289 (42%)	4,353 (41%)	4,036 (33%)	15,476 (59%)	18,053 (58%)

Data: Ministry of Environment

3.3 Rivers Water System Management Fund

Besides the special accounts for environmental improvement of the Ministry of Environment, the water system management fund is raised from the water use charges introduced by 4 Rivers Act is playing an important role in Korea's environmental investment. In 1998, the parliament established the Act on the Improvement of Water Quality and Support for Residents of the Riverhead of the Han River System in order to set the watershed areas in Han River, execute water pollution caps, expand residents support, secure environmental base facilities and prepare the base for water use charges. From 1999, therefore, Han River watershed fund was operated in full scale. After 2002, Nakdong River watershed management fund was made and operated based on the Act on the Management of Water and Support of Residents in the Nakdong River Basin along with Geum River watershed management fund based on Act on the Management of Water and Support of Residents in the Geum River Basin and Youngsan River and Seomjin River watershed management fund based on the Act on the Management of Water and Support of Residents in the Yeongsan and Seomjin River Basins.

Table 1-3 | Annual Revenue Progress of the Watershed Management Fund for 4 Major Rivers

(Unit: 0.1 Billion Won)

Water System	Total	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Total	52,363	277	2,035	2,748	3,525	5,837	6,872	7,226	7,408	7,600	8,835
Han River	31,807	277	2,035	2,748	3,108	3,356	3,334	3,760	3,963	4,128	5,098
Nakdong River	11,188	-	-	-	269	1,491	1,968	1,851	1,743	1,822	2,044
Geum River	5,247	-	-	-	70	521	795	918	987	968	988
Youngsan River	4,121	-	-	-	78	469	775	697	715	682	705

Data: Ministry of Environment

The 4 River Water Management Act is allowing the water supplier to impose water use charges on the final consumers in proportion to water use so that the money will go to the watershed management fund. The watershed management fund is supposed to be used for the income increase project, welfare project and education project for the residents in water source management area and the newly regulated area for water quality preservation as well as the water quality improvement projects such as the installation and operation

of environmental base facilities. The rate of water use charges shall be decided by each watershed management committee based on the enforcement decree of the 4 River Watershed Management Act and shall be announced by the Minister of Environment every two years. In case of Han River water system, 80 won per ton was imposed during 1992~200, 110 won per ton during 2001~2002 and 120 per ton during 2003~2004. In 2005, 140 won per won was planned to be imposed but it was finally adjusted to be 130 won per ton.

4. Overview of the Environmental Charging System in Korea

The instruments for environmental policy can be divided into market-based instruments; indirect regulation or human based regulation and non-market-based instruments; direct regulation or CAC, and the market-based policies can be divided into tax (or charge) and emission right trade system.

The most widely used policy is the method to restrict the actions of corporations and individuals through the setting of emission standard, technology standard and so forth. Such policy is called direct restriction or command and control instruments. An emission standard is set by designating the limit of emission of pollutants or regulating the emission related activities. In other words, it is the method to limit the use of a certain material or to set the environmental standard for building, capital facility, consumption material and so forth. On the other hands, technological standard is the method to designate a certain device or procedure as a standard and introduce it. For example, it is to designate efficiency levels of energy use devices and encourage using devices with high efficiency levels in order to reduce the emission of carbon dioxide.

If other conditions are met, direct regulations have the same effect with market based instruments in the aspect of static efficiency. Considering the trade costs such as tax rate decision, decision on the right amount of emission and so forth, it can be more cost effective than market based instruments in short-term. As direct regulations do not provide the dynamic cause, which is the development and introduction of new technology, however, it is inferior to the market based instruments in long-term. Based on such reason, the introduction of market based policy is receiving lots of attention these days.

The market based instrument that is being studied intensively these days is the method for the government to control the related price variations and thus control the consumption and production activities of economic subjects indirectly. The most representative market based policy instruments are tax (charge) and emission right trade system. Tax or charge is the policy instrument that restricts related economic activities by imposing tax in proportion to the emission of pollutants. Emission right trade system is to distribute certain amounts of emission rights to private sectors and let the emitters trade the rights freely. As the market based instrument lets the individual economic subjects decide the amount of emission by

themselves, the marginal abatement costs between emitters are same and therefore the pollution control cost of the entire economy is minimized.

Through market-friendly economic attraction tools rather than direct regulation, new environmental management system was introduced and the existing system was reinforced in order to deal with the advanced nation type environmental problems that emerged in 1990s. Regulatory tool was prepared in order to secure the financial resources for environmental investment, and the economic instruments that were widely used in the advanced nations such as OECD member countries at that time were adopted aggressively. In Korea, there was the improvement of the system that adds the basic charging system to the emission charging system in 1990 and waste deposit and charge system was implemented as a waste recycling promotion measures to deal the problem of waste that emerged as a new social problem in 1990s. In 1995, the waste caps system was newly introduced, which was a truly innovative measure in managing organic waste. Besides, environment improvement charge was made in order to meet the demand of environmental investment in 1990s and special account for the environmental improvement was installed. The environment charging systems that have been introduced so far include 23 charging systems including emission charges, environmental improvement charges and so forth. Concerning the charges for environmental improvement, starting with the introduction of emission charges (Clean Air Conservation Act Article 19, December of 1981), there are 23 environment related charges being executed as of 2009. According to the Article 20 of the Special Act on the Improvement of Air and Environment for Seoul Metropolitan Area, emission caps excess charge was imposed from 2005 and the environmental charges became 23 charges.

Korea's environmental charging system can be divided into several forms according to its classification standard. The general classification method by the Ministry of Strategy and Finance is a classification by installation purpose. The environment related charges can be divided by the same method, and the content is shown in <Table 1-4>. It can be classified into five types according to the purpose and object of imposition.

Table 1-4 | Classification of the Environmental Charging System according to the Purpose of Establishment

Category	Environmental Charging System
User, Polluter Charges	Polluter charges (water, sewage system), ecosystem preservation cooperation charges
Benefiter Charges	Water quality improvement charges (underground water), water use charges (4 rivers including Han River), environmental contamination prevention project cost
Deposit	Waste processing security deposit, waste processing facility post management security deposit, recovery deposit
Tax Charges	Emission charges (air, water and livestock waste), environmental improvement charges (diesel vehicle, facility), caps excess charges (3 Rivers including Nakdong River), waste charges

Data: Ministry of Strategy and Finance

Different from the charges of other departments beside the Department of Environment, the environmental charging system can be divided by its original characteristic and clear purpose. Through such classification, rationale and redundancy can be judged in the arrangement and revision of charges. In <Table 1-5> and <Table 1-6>, environment related charges are divided and arranged according to environmental medium and environmental improvement effect in addition to the existing classification methods.

Table 1-5 | Environmental Charging System According to the Classification of Environmental Mediums

Category	Environmental Charging System
Air	Emission charges (air), environmental improvement charges (diesel vehicle, facility), air caps excess charges
Water Quality	Environmental improvement charges (water quality), water quality improvement charges (underground water), emission charges (water quality and livestock waste) water use charges (4 rivers including Han River), caps excess charges (3 Rivers including Nakdong River), environmental contamination prevention project cost
Waste	Waste charges, recycling charges, waste processing security deposit, waste facility post management security deposit
Natural Environment	Recovery deposit, ecosystem preservation cooperation charges
Water and Sewer System	Polluter charges (water, sewer system)

Note: Local governing body imposed waste collection fee and sewer system use fee additionally as the cost for processing organic waste and organic waste water
Data: Ministry of Strategy and Finance

Table 1-6 | Classification of the Environmental Charging System According to the Effect of Environmental Improvement

Category	Environmental Charging System
Restriction of Emitting Pollutants	Emission charges (air, water and livestock waste), environmental improvement charges (diesel vehicle, facility), caps excess charges (3 Rivers including Nakdong River), waste charges, air caps excess charges
Preservation of Natural Resources	Water quality improvement charges (underground water), water use charges (4 rivers including Han River), ecosystem preservation cooperation charges
Promotion of Recycling	Recycling charges
Deposit	Waste processing security deposit, waste processing facility post management security deposit, recovery deposit
Paying the Project Cost	Polluter charges (water, sewer system), environmental contamination prevention project cost

Data: Ministry of Strategy and Finance

<Table 1-7> is presenting the content of new environmental charging systems for each year (By the Ministry of Environment)

Table 1-7 | Content of New Environmental Charging Systems for Each Year (By the Ministry of Environment)

Year	Number	Name of Charge
'61~'69	2	Damager charge according to the Article 32 of the Sewer System Law (1966) Causer charge according to the Article 32 of the Sewer System Law (1966)
'70~'79	0	-
'80~'89	3	Emission charge according to the Article 19 of the Clean Air Conservation Act (1983) Emission charge according to the Article 19 of the Water Quality Conservation Act (1983) Environmental contamination prevention project cost according to the Article 13 of the Environment Improvement Expenses Liability Act (1987)
'90~'99	12	Water quality improvement charge according to the Article 28 of the Causer charge according to the Article 28 of the Management of Drinking Water Act (1995) Discussion standard excess charge according to the Article 33 of the Act on Assessment of Impacts of Works on Environment, Traffic, Disasters Etc. (1997) Waste processing security deposit according to the Article 42 and Paragraph 2 of the Waste Management Act (1999) Water use charge according to the Article 19 of the Act on the Improvement of Water Quality and Support for Residents of the Riverhead of the Han River System (1999) Waste processing deposit according to the Article 18 of the Act on the Promotion of Saving and Recycling of Resources (1992)→Improvement of the system, recycling charge according to the regulation of Article 19 (2002)

Year	Number	Name of Charge
'00~'06	8	Ecosystem preservation cooperation charge according to the Article 49 of the Natural Environment Conservation Act (2001) Caps excess charge according to the Article 13 of the Act on the Management of Water and Support of Residents in the Geum River Basin (2001) Water use charge according to the Article 30 of the Act on the Management of Water and Support of Residents in the Geum River Basin (2001) Caps excess charge according to the Article 13 of the Act on the Management of Water and Support of Residents in the Nakdong River Basin (2001) Water use charge according to the Article 32 of the Act on the Management of Water and Support of Residents in the Nakdong River Basin (2001) Caps excess charge according to the Article 13 of the Act on the Management of Water and Support of Residents in the Youngsan River and Seomjin River Basin (2001) Water use charge according to the Article 30 of the Act on the Management of Water and Support of Residents in the Youngsan River and Seomjin River Basin (2001) Caps excess charge according to the Article 20 of the Special Act on the Improvement of Air and Environment for Seoul Metropolitan Area (2003)

Data: Ministry of Environment

Chapter 2

Selection of the Environmental Improvement Charging System Applicable to Developing Nations

1. State of Environmental Contamination in Developing Nations

2. Selection of the Environmental Improvement Charging System Applicable to Developing Nations

Selection of the Environmental Improvement Charging System Applicable to Developing Nations

1. State of Environmental Contamination in Developing Nations

Compared to advanced nations where industry is well developed, developing nations have more serious environmental contamination. Even though developing nations have more serious living environment contamination compared to advanced nations, they have weak administrative base to execute environmental policies. Developing nations usually possess abundant natural environmental resources, but air and water quality is deteriorating and the generation of wastes is increasing in the process of economic development, thus facing serious environmental pollutions. Due to the poor condition to execute policies to deal with such environmental problems, people's unawareness of environmental problems and the policies to prioritize economic development rather than environment, it is difficult to execute environmental policies.

Table 2-1 | The State of Environmental Contamination and the Condition for Policy Promotion in Developing Nations

Object	State of Environmental Contamination	Urgency of Environmental Improvement	Condition for Financial Supply	Condition for Policy Execution
Air Quality	Urban air quality is deteriorating	○	X	○ Demand for development is rapidly increasing due to economic development and population growth ○ Increase of airpollutants from cars and factories ○ Lack of instrument to apply the principle of charging on polluters and benefiters ○ Difficult to supply the finance for environmental investment
Water Quality	Deterioration of surface water (river, lake, ocean) and underground water	○	X	
Waste	Waste production is increasing, recycling rate is not enough	○	X	
Natural Environment	Abundant natural environment	X	△	
Water and Sewer System	Water and Sewer System Poor infrastructure	△	△	

Data: Korea Environmental Industry & Technology Institute

In the metropolitan areas of developing nations, fine dust and NOx are exceeding the air environment standard and major air polluters include transportation means, power plant, factory, construction, mountain fire, mountain farming and so forth. In addition, they face major water contamination problems such as the increase of biological oxygen demand, increase of total coliform bacteria, ammonia contamination and so forth. Massive amount of unprocessed waste water from farming, living, commerce and industry flows into river, lake and ocean, causing serious surface water contamination.

In case of developing nations, massive wastes are produced in highly populated and industrialized areas. The total amount of wastes is increasing due to development projects, population increase, economic growth and so forth. And most of the waste byproduct is dumped due to the low waste recycling rate, causing the increase of total waste production. Especially, the recycling rate in rural areas is significantly lower than the recycling rate in urban areas.

Table 2-2 | The State of Environmental Contamination in Major Developing Nations

	Air	Water Quality	Waste	Others
China	Emission of air pollutants is increasing According to the urban air quality study in 2006, air quality was improved but the air quality in some cities are very serious	Total amount of waste water is increasing Major pollutants include COD and ammonia nitrogen from many urban and rural areas Initial contamination state in Songhua River, Yellow River and Huaihe River and serious contamination in Liaohe River and Haiho River	Operate 419 urbanorganic waste processing plants as of 2005 Processing methods include landfill (82.3%) and incineration (12.9)	Urban waste water production in Chinais 36.25 billion ton as of 2006 and waste water processing rate is 55.7% significantly lower than advanced nations In many cities, resource process technology is supplied such as power generation organic waste gas and waste reutilization
Malaysia	Air pollution is serious in Selangor in Malaysia Increase of SO_2 is significant and NOx and CO are increasing significantly	Measure the water quality index with the standard of 6 categories such as BOD and so forth Water contaminationis serious in Air Terjun Rive in Pinang, contamination is in progress in rivers inTeblau, Kilang Uni, Masai and so forth The major causes of river contamination include non waste water processing, manufacturing industry and so forth	Solid wastes are increasing continuously. Among them, 45% is food waste 95% of the waste from Kuala Lumpuris processed by landfill	Air pollution is serious in Selangor due to geographical location, industrial activity, population density, many cars and so forth Waste water emission is a serious problem of manufacturing industry, 25% of the total waste water emission is from Selangor

	Air	Water Quality	Waste	Others
India	Air quality is deteriorating due to rapid population growth and economic development Pollutants are mostly particles from home cooking, industrial facility, car exhaustion gas and so forth The number of cars is increasing rapidly from economic development and emission of toxic material is possible from manufacturing processes	Water contamination is serious due to population growth and rapid urbanization Potassium density is high and fertilizer and agricultural chemical are induced into rivers Regarding industrial waste water, beverage industry is highest (38%) followed by chemical industry (29%) and pulp industry (19%)	60% of the waste is produced from urban areas Regarding urban solid waste, organic material is the highest (40%) followed by possible recycling material (8%) About 90% of the recovered waste is buried in suburban areas	Major environmental problems in India include air pollution, surface water contamination, lack of water, waste processing, loss of forest and so forth Due to rapid population growth and economic growth, there is a serious water contamination from urban waste water, industrial and agricultural waste water and so forth Waste processing is also a serious issue as there is not enough landfill and recovery process is difficult
Brazil	Air pollution in major cities is a little higher than major cities in the world, major polluters include cars and industrial complexes Urban areas in San Paulo and Rio De Janeiro and industrial development areas	In spite of abundant fresh water, the waste water processing rate is 48.3% of the urban population as of 2006 Waste water processing rate is only 32.2%	The recovery and processing of organic waste and hazardous waste are the assignments of the government Waste recycling rate is lesws than 5% Only 23% of the solid waste is buried under supervision Waste landfill is not enough compared to demand causing the contamination ofdrinking water and children's diseases	Brazil is one of the 4 major greenhouse gas emitter next to China The rate of dependence on recycled energies such as waterpower, bio fuel and soforth is high and therefore carbon emission is low

Data: Korea Environmental Industry & Technology Institute

2. Selection of the Environmental Improvement Charging System Applicable to Developing Nations

Korea attempted rapid economic development, and serious environmental problems emerged in the process of economic development. Much financial investment was needed to solve the problem of environmental pollutions such as air pollution, water pollution, waste and so forth; however, related financial source was not enough. Therefore, various environmental charging systems were introduced based on the principle of charging on polluters and benefiters being conducted in advanced nations and necessary financial sources were prepared to improve the environment and invest in the basic environmental facilities. It is evaluated to be very successful systems.

In Korea, for various environmental mediums such as air, water, waste and so forth, 23 environmental charging systems are introduced and operated. As shown in <Table 2-3>, Korea's major environmental charging systems are evaluated in the aspect of charging principle, originality of the system, effect of environmental improvement, function of financial supply and the success of system operation and the possibility of application to developing nations will be sought. As a result of evaluation, emission-charging system (air, water quality), environmental improvement charging system, EPR system appeared to be applicable to developing nations. Water usage charge appeared to be at medium level and water quality improvement charge, waste charge and ecosystem preservation cooperation charge appeared to be low. Water use charge is an advanced nation type political tool that applies the principle of charging on benefiters. In case of Korea, it has been established as a unique system through many improvements and is considered to be a successful policy. It is evaluated as a good governance case that solved the conflicts between upper and lower classes through conversation and negotiation, but it is considered to be premature to encourage its introduction considering the current economic conditions and developmental levels of the developing nations.

Table 2-3 | Standards for Selecting the Environmental Charging System Applicable to Developing Nations

Environmental Charge	Charging Principle		System Originality	Effect of Environmental Improvement	Function of Financial Supply	Success of System Operation	Possibility to be Introduced to Developing Nations
	Polluter	Benefiter					
Emission Charging System (Air, Water Quality)	○		○	○	△	○	High
EPR System	○		○	○	△	○	High
Environmental Improvement Charging System	○		○	○	○	○	High
Water Use Charge		○	○	○	○	○	Medium
Water Quality Improvement Charge		○	X	△	○	○	Low
Waste Charge	○		X	△	○	○	Low
Ecosystem Preservation Cooperation Charge	○		X	X	○	○	Low

[Evaluation Standard]
① Charging principle: Mark ○ if it is relevant
② System originality: Mark ○ if there is system originality in Korea and mark X if there is no originality.
③ Effect of environmental improvement: Large effect (○), limited effect (△), little or no effect (X)
④ Function of financial supply: Large effect (○), limited effect (△), little or no effect (X)
⑤ Success of system operation: Mark ○ if system operation is successful in Korea and mark X if it is not successful.
⑥ Possibility to be introduced to developing nations: Mark as high, medium and low

As for the environmental charging systems applicable to developing nations, emission charging system, environmental improvement charging system and extended producer responsibility (EPR) system were considered. The major characteristics of the emission charging system (air, water quality), environmental improvement charging system and EPR system selected by evaluating the emission charging system, environmental improvement system and EPR system used in Korea can be summarized as follows in <Table 2-4>. First of all, emission charging system is applied to air and water quality management in order

to improve the quality of air and water and is operated in accordance with the principle of charging on polluters. In the environment improvement charging system, charges are also imposed for air and water pollutants. However, the purpose of the policy is to reduce the amount of air and water pollutants generated by diesel vehicles and facilities. In the extended producer responsibility (EPR), recycle charges are imposed for wastes and it is introduced to encourage the recycling of wastes by producers.

Table 2-4 | The Environmental Charging System Applicable to Developing Nations

Charges	Environmental Medium	Policy Goal	Charging Principle	Use of Financial Resource
Emission Charging System (Air, Water Quality)	(Air, Water Quality)	Reduction of air and water pollutants from manufacturing industry	Principle of charging on polluters	Support the investment cost in prevention facility
Environmental Improvement Charging System	(Air, Water Quality)	Reduction of air and water pollutants from diesel vehicles and facilities	Principle of charging on polluters	Make financial resource for environmental investment
EPR System	Waste	Enhance the waste recycling rate by producers	Principle of charging on polluters	Support the project of waste recycling

Chapter 3

Major Content and Operation Experience of the Environmental Charging System

1. Major Content and Operation Experience of the Emission Charging System
2. Major Content and Operation Experience of the Environmental Improvement Charging System
3. Major Content and Operation Experience of the Extended Producer Responsibility (EPR) System

Major Content and Operation Experience of the Environmental Charging System

1. Major Content and Operation Experience of the Emission Charging System

1.1 Background of Introduction

Emission charging system was first introduced as a supplementary tool for the management of emission facility when revising the environmental protection law in July of 1982. After a year of legal and administrative preparations, it began to take effect in September of 1983.

For the businesses that were found while operating emission facilities exceeding the emission limit of the pollutants, the charging system in the beginning was to impose charges for the amount of pollutants over the emission limit from the time of command for correction to the completion of correction. It was operated as a punishment type of system. As a part of economic guidance tools that encourage the proper processing of pollutants, it worked as a supplementary tool to the direct regulation of environmental contamination.

After its introduction in 1983, emission charging system was revised several times. In 1991 after the foundation of the Department of Environment, the basic charging system of imposing charges according to the emission amount of pollutants even if it is under the emission limit was introduced and the system was changed from punishment type charging system to the environmental resource use fee type charging system. The basic charging system was originally introduced in Korea. While the environmental improvement charging system of non-manufacturing sectors (distribution, consumption and diesel vehicle) introduced in 1992 is imposing charges in proportion to the amount of emission, the emission charges were different. Therefore, charges were imposed within the limit for the sake of equality. In case of large businesses (manufacturing businesses), they have much large limits and thus more responsible for the environmental contamination. As the emit

pollutants under the emission limits, however, they tend to be immune to contamination and technological innovation was needed to encourage the reduction of pollutants and improvement of environment. Emission charging system was successfully established in Korea and is considered as a system that contributes to the reduction of pollutants and the businesses' investment in prevention facilities. However, the emission charging system has the rate of charges that are too low and the corporations' autonomous inhibition of contamination and technological innovation that this system purses are insignificant.

Emission charging system is not only the most representative economic instrument to induce the minimization of emission of pollutants by imposing economic pressure on business owners but also the first case that applied the principle of charging on polluters for the actions that cause contamination. The collected charges were used for the financial resource of environmental contamination prevention fund for long-term low interest loan of the business owners' investment in prevention facilities. Emission charging system can be considered as a system that guarantees the technological innovation for medium and long-term environmental improvement while providing the cause for the emitters to reduce contamination.

1.2 Major Content and Operation Experience

1.2.1 Emission Charging System

Emission charging system was installed based on the Article 19 of the Clean Air Conservation Act. Impose and collect emission charges on business owners who emit air pollutants (operator of joint prevention facility included) and those who install or change emission facilities without change approval or change report in order to prevent or reduce the damages on atmospheric environment by air pollutants. It is the system to impose the handling cost on emitters in order to prevent or reduce the damages on atmospheric environment by air pollutants (announced on December 31st, 1981, enforced on September 1st, 1983). When emission charges are not paid before the deadline, additional charges are supposed to be calculated and imposed. In emission charging system, the amount of pollutants are measured in the field by using a dust collector.

Table 3-1 | Base for Imposing Emission Charges

Category	Base Law	Summary of Regulations
1. Act	Article 19 of the Clean Air Conservation Act	Impose emission charges on the business owners who emit air pollutants - Basic charges Business owner who emitted pollutants under the emission limit (5 businesses are not included) - Excess charges: Business owner who emitted pollutants over the emission limit Impose additional charges if mission charges are not paid before the payment deadline
2. Enforcement Decree	Article 15 or 31 of the Clean Air Conservation Act	Divide the emission charges into excess charges and basic charges and - Pollutants for charging (excess 9 kinds, basic 2 kinds) Calculation and imposition of additional charge Facilities that are exempt for charges
3. Enforcement Regulation	Article 43 or 47 of the Clean Air Conservation Act enforcement regulation	Related document (Emission report and exemption document and so forth)
4. Directive	Emission charge office process regulation	Decide the procedure and content of office work such as imposition of emission charges and refund work.
5. Others	Basic emission charge work manual	Present the procedure and detailed method of handling emission charges

Emission charges are divided into basic charges and excess charges. Basic charge is imposed when the business owner emits under the emission standard, and excess charge is imposed when the business owner emits over the emission standard. Regarding the contaminated materials, excess charges are applied to 9 kinds (sulfur oxide, dust, ammonia, hydrogen sulfide, carbon disulfide, fluoride compound, hydrogen chloride, chloride and hydrogen cyanide) and basic charges are applied to 2 kinds (sulfur oxides, dust).

Regarding the imposition and collection, the institution in charge is the Ministry of Environment and the imposition and collection institutes are local governing bodies. Regarding the right to impose and collect the emission charges, along with the right to

manage and supervise the emission facilities, 1~2 type businesses among industrial complexes and other areas are committed to the governor and 3 type businesses among other areas are committed to the mayor and county head.

Table 3-2 | Comparison of Basic Charge and Excess Charge in Emission Charges

Category	Basic Emission Charges	Excess Emission Charges:
Reason for Imposition	Impose according to the amount and density of pollutants that air pollutants emission business owners emit under the emission limit (business owners exempted from improvement charge are not included)	Exceed the emission limit
Imposition Object Pollutant	2 kinds (sulfur oxide, dust)	9 kinds (sulfur oxide, dust, ammonia, hydrogen sulfide, carbon disulfide, fluoride compound, hydrogen chloride, chloride and hydrogen cyanide)
Imposition Period	Impose biyearly (twice a year)	From the point of exceeding the emission limit to the point of completing the correction
Imposition Calculation Method	Adjust based on the data submitted by the business owner	Result of inspection by administrative institute Auto measurement data of the auto measurement business Improvement plan submitted voluntarily
Imposition Calculation Formula	① Emission amount within the limit (kg) × ② Imposition amount per 1kg of pollutant × ③ Annual imposition amount calculation index× ④ Imposition index for each region × ⑤ Imposition coefficient for each density	‹In case of voluntary improvement› ① Imposition amount per 1㎏ of pollutant × ② Emission amount of material that exceeds the emission limit (㎏) × ③ Imposition index for each region × ④ Annual imposition amount calculation index ‹Improvement command and etc.› ① Imposition amount per 1kg of pollutant × ② Emission amount of materials that exceeds the emission limit (kg) × ③ Imposition index per the rate of exceedingthe emission limit × ④ Imposition index per each region × ⑤ Annual imposition amount calculation index × ⑥ Imposition coefficient per the number of violations

The basic charge is imposed for the total emission of pollutants emitted under the emission limit, and the object pollutants are sulfur oxide and dust. It is imposed biyearly (first half and second half). Basic charge is not imposed on the limit regulation area according to the Special Act on the Improvement of Air and Environment for Seoul Metropolitan Area.

The excess charge is imposed in order to secure the observation of the standard (observation of the command for improvement and etc.) and induce the reduction of pollutants by giving economic pressure for emitting pollutants, and the object pollutants are 9 kinds including sulfur oxide, dust, ammonia, hydrogen sulfide, carbon disulfide, fluoride compound, hydrogen chloride, chloride and hydrogen cyanide.

According to the Special Act on the Improvement of Air and Environment for Seoul Metropolitan Area, regarding nitrogen oxide, sulfur oxide and dust, if the annual emission amount is more than 4 ton, there is no basic charge as total amount regulation is in place for most areas. For the rest of the air pollutants, however, excess charges are imposed just like other areas.

On the other hand, the collection rate of the emission charges is not very high. In 2009, there were 5,027 cases and 4,520 collections. Among the charges of 8.4 billion won, 6 billion won was collected showing 71.3% of collection rate (refer the Table 3-3). In case of Gyeonggido, the emission charge in 2006 was 1,219,099,590 won and the collection rate including the losses due to nonpayment was 71.50%. The main provincial government building marked 94.25%, the second building marked 70.78% and the average collection rate in cities and counties of Gyeonggido was 53.87%. The objects of imposition in the main provincial government building were 194 businesses. Among them, objects of basic charges were 54 places and objects of excess charges were 10 places. The business areas of the objects were non-metal (23), chemical (8), paper (7), food (7), metal (3), textile (2) and others (14). The collection rate in 18 cities and counties including Suwon, Bucheon, Anyang, Ansan and so forth was 100%, but Hwasung (7.52%) and Uijeongbu (2%) showed very low collection rate.

Table 3-3 | Imposition and Collection Record of the Annual Emission Charges

(Unit: Case, Million Won, %)

Category	Imposition		Collection		Difference		Collection Rate
	Number of Cases	Amount (a)	Number of Cases	Amount (b)	Number of Cases	Amount	(b/a)
Total	68,824	217,460	63,173	142,294	5,651	75,166	65.4
2009	5,027	8,414	4,520	6,000	507	2,414	71.3
2008	5,931	9,457	5,120	5,446	811	4,011	57.6
2007	5,302	11,521	4,544	7,447	758	4,074	65.1
2006	4,756	8,039	4,120	6,384	636	1,655	79.4
2005	8,044	9,825	7,390	7,076	654	2,749	72.0
Before 2004	39,764	170,204	37,479	109,941	2,285	20,263	64.6

The legal uses for emission charges include national environmental improvement project, support of environmental improvement project by local govern body, business cost and operation cost of Korea Environmental Corporation and so forth. In the private sector, supports are given to the localization of environmental industry and the technological development fund. 10% of the charges collected by the Ministry of Environment is given to each province as general account budget (Article 31 of Clean Air Conservation Act Enforcement Decree). For the charges collected by cities and counties, the province redistributes to cities and countries.

Excess emission charges are imposed on the business owners who emit air pollutants exceeding the emission limit (imposition object: Article 19 of the enforcement decree of the law). Though basic emission charges are imposed on all business owners who emit air pollutants, but exemption is applied to facilities that use low sulfur fuel and the facilities with less than 30% of the emission limit. People responsible for the payment are pollutant emitters and non-approved and non-reported business owners.

Table 3-4 | Legal Use of Emission Charges

Purpose of Use	Related Law
• National environmental improvement project • Support the environmental improvement project by local governing body • Business cost and operation cost of Korea Environmental Corporation • Use according to each paragraph of the Article 58 of the Protection of wild Fauna and Flora Act • Installation of basic environmental facilities by local governing body, installation of environmental contamination protection facilities by private sector, installation of low pollution production facility and loan for necessary technological development • Study about environmental policy, technological development, promotion activity, research and support for environment research institutes by private sector • Payment of the cost needed for fulfilling national responsibility according to the Article 4 and Article 21 of the Act on the Control of Trans-Boundary Movement of Hazardous Wastes and Their Disposal • Payment of reward according to the Article of the Act on Special Measures for the Control of Public Health Crimes • Payment of the principal and interest of the deposit, loan and credit according to the Paragraph 5 or Paragraph 8 of the Article 3 of the Environment Improvement Expenses Liability Act • Distribution of tax revenues collection cost in the account • Other costs needed for the operation of the account	Article 4 of the Special Accounts for the Environmental Improvement

The objects of reduced emission charges and the reduction rates can be summarized as in <Table 3-5>.

Table 3-5 | Reduction Object and Reduction Rate of the Emission Charges

Reduction Object	Reduction Object (%)
- First, burner that uses less than 0.5% of sulfur inclusion (0.3% in case of power generation facility)	Entire basic charge is exempt
- Military facility according to the Protection of Military Installations Act	Entire basic charge is exempt
- Third, air emission 5 kinds businesses	Entire basic charge is exempt
- Fourth, air emission 4 kinds businesses	50% of the basic charge is exempt

1.2.2 Water Quality Improvement Charging System

Water quality improvement charging system as installed in 1983 based on the Article 19 of the Water Quality Conservation Act. It is the system to impose the handling cost on causers in order to prevent or reduce the damages on water environment by water pollutants (Article 41 of the Water Quality Conservation Act) In the water quality improvement charging system, the emission amount is measured by Tele-Metering System and self measuring system (by using record log). Exemption is given to 5 poor manufacturing industries. Regarding the measuring of water quality emission amount, data is transmitted automatically by TMS method.

Regarding the imposition and collection, the institution in charge is the Ministry of Environment and the imposition and collection institutes are local governing bodies. In case of water quality emission charges, regional environment corporations are included. Regarding the right to impose and collect the emission charges, along with the right to manage and supervise the emission facilities, 1~2 type businesses among industrial complexes and other areas are committed to the governor and 3 type businesses among other areas are committed to the mayor and county head.

Table 3-6 | Base for Imposing Water Quality Improvement Charges

Category	Base Law	Summary of Regulations
1. Act	Article 19 of the Water Quality Conservation Act	In order to prevent or reduce the damages on water environment by water pollutants, if approved or reported business owners or unapproved or unreported business owners emit pollutants, emission charges are imposed and collected. - Basic emission charges Business owner who emitted pollutants exceeding the emission water quality standard (5 businesses are not included) - Excess emission charges: Business owner who emitted pollutants over the emission limit. Impose additional charges if emission charges are not paid before the payment deadline
2. Enforcement Decree	Article 13 or 27 of the Water Quality Conservation Act	Imposition objects, kinds of pollutants, calculation methods and standards
3. Enforcement Regulations	Article 31 or 38 of the Water Quality Conservation Act enforcement regulation	Payment notice, delayed imposition and installment payment
4. Directive	Emission charge office process regulation	It is defined to make the imposition work smooth by defining the matters necessary for the collection and refund of emission charges according to the Article 19 of the Water Quality Conservation Act, Article 19 of the Clean Air Conservation Act and the Article 29 of the Act on the Disposal of Sewage, Excreta and Livestock Wastewater.
5. Others	Handling of unpaid emission charges	It is to make the handling of imposition work smooth by defining the condition for the nonpayment of the emission charges and the procedure for handling the work.

Water quality emission charges can be divided into basic charges and excess changes, and the basic emission charges (basic charges) are imposed when the pollutants are emitted under the emission limit but exceeds the emission water quality standard of the waste water processing plant in the waste water coming out of the waste emission facilities or when the pollutants exceeds the emission water quality standard of the waste water processing

plant in the water coming out of the waste water processing plant. The object pollutants for basic charge include organic materials (BOD, COD), suspended solids (SS). Regarding the amount per kg of pollutants, 250won/kg is applied to organic materials (higher density is applied between BOD and COD) and suspended solids (SS).

In case pollutants are emitted from waste water zero discharge facility exceeding the emission limit, excess emission charges (excess charges) are calculated by adding the fixed imposition amount per each business size to the amount calculated by the emission amount and density of the pollutant. The object pollutants for excess charges are 19 kinds including the object pollutants for imposing basic emission charges. The imposition amounts per kg of pollutants are as follows.

Table 3-7 | Amount of Imposition per Kg of Contaminated Material

(Unit: Won)

Amount of Pollutant	Organic Material	Suspended Solid	Chrome and its compound	Manganese and its compound	Zinc and its compound	Phenol	Cyanide	Copper and its compound	Cadmium and its compound	Mercury and its compound
Imposition Amount per Kg	250	250	75,000	30,000	30,000	150,000	150,000	50,000	500,000	1,250,000
Amount of Pollutant	Organic phosphorous compound	Arsenic and its compound	Lead and its compound	Hexavalent chromium compound	Polychlorinated biphenyl	Drichloro Ethylene	Tetrachloro ethylene	Total nitrogen	Total phosphorous	
Imposition Amount per Kg	150,000	100,000	150,000	300,000	1,250,000	300,000	300,000	500	500	

The charges are imposed on the business owners who emit the pollutants including the representative of the joint prevention facility operation organization and the operator of the waste water processing plant. The people responsible to pay are those who emitted pollutants more than the standard limit in the relevant area.

Table 3-8 | Imposition and Calculation of the Water Quality Improvement Charges

Category	Basic Emission Charges	Excess Emission Charges:
Reason for Imposition	Emitted under the emission limit but exceeded the emission water quality standard of the waste water processing plant In the waste water of the waste water processing plant, the pollutants exceeded the water quality standard of the waste water processing plant	Exceed the emission limit Emit pollutants into public water from waste water zero discharge emission facilities
Imposition Object Pollutants	2 kinds (organic material, suspended solid)	19 kinds (object pollutants for basic emission charges are included)
Imposition Period	Impose biyearly (twice a year)	From the point of exceeding the emission limit to the point of completing the correction
Charges Calculation Method	Adjust based on the data submitted by the business owner	Submit improvement plan
Charges Calculation Formula	① Emission amount within the limit (kg) × ② Imposition amount per 1kg of pollutant × ③ Annual imposition amount calculation index × ④ Imposition index for each business × ⑤ Imposition index for each region x ⑥ Imposition coefficient for each excess rate of emission water quality standard	① Emission amount of pollutants that exceed the standard (kg) × ② Imposition amount per 1kg of pollutant × ③ Imposition calculation index for each year × ④ Imposition coefficient for each region × ⑤ Imposition coefficient for each excess rate of emission limit standard × ⑥ Imposition coefficient for the number of violations + ⑦ Fixed amount charge for each business size ※ ⑤ ⑥ ⑦ are excluded in case of voluntary improvement

Regarding the record of imposing and collecting water quality emission charges for each year, there were 1,962 impositions in 2009 and 1,122 collections were made. Regarding the amount, 27.3 billion won was imposed in 2009 and 2.8 billion won was collected meaning only 10.1% of collection rate.

Table 3-9 | Imposition and Collection Record of the Annual Water Quality Improvement Charges

(Unit: Case, Million Won, %)

	Imposition		Collection		Difference		Collection Rate
	Number of Cases	Amount (a)	Number of Cases	Amount (b)	Number of Cases	Amount	(b/a)
Total	29,957	443,425	20,230	64,738	9,727	378,687	14.6
2009	1,962	27,251	1,122	2,761	840	24,490	10.1
2008	2,295	32,882	1,359	5,313	936	27,569	16.2
2007	2,627	40,361	1,607	5,459	1,020	34,902	13.5
2006	2,497	42,714	1,461	4,867	1,036	37,847	11.4
2005	3,616	50,627	1,690	3,984	1,926	46,643	7.9
Before 2004	16,960	249,590	12,991	42,354	3,969	207,236	17.0

※ Differences appeared between the imposed amount and collected amount due to the accumulation of delayed payment, administrative lawsuit, business closure, bankruptcy, installment payment and so forth.

For example, the water quality emission charge in Gyeonggido was 21,275,127,940 in 2006 but the collection rate of the water quality emission charge including the losses due to nonpayment was 28.87%. The main provincial government building marked 33.33%, the second building marked 68.52% and the average collection rate in cities and counties of Gyeonggido was 13.08%. The objects of imposition in the main provincial government building were 57 businesses. Among them, objects of basic charges were 5 places and objects of excess charges were 5 places. The businesses included paper, chemical, nonmetal, food and so forth. In Anyang, Gunpo, Guri, Gwangju and Uiwang, the collection rate was 100% whereas Uijeongbu (5.81%) and Bucheon (2.18%) showed very low collection rates. In addition, the major cases of past water quality excess charges are shown in <Table 3-9>.

The objects of reduced emission charges and the reduction rates can be summarized as in <Table 3-10>.

Table 3-10 | Reduction Object and Reduction Rate of the Water Quality Improvement Charges

Reduction Object	Reduction Object (%)
- First, business owners with the business size of 5 kinds	Entire basic charge is exempt
- Business owners who induce waste water into waste water processing plant	Entire basic charge is exempt
- Business owners who induce waste water into sewage water processing plant	Entire basic charge is exempt
- Fourth, business owners who did not emit pollutants exceeding the emission water quality standard for more than 6 months as of the imposition standard date of the year	From 6 months to 1 year: 20/100 From 1 year to 2 years: 30/100 From 2 years to 3 years: 40/100 More than 3 years 50/100
- Business owners who reuse the waste water from the emission facility before releasing it to the final emission exit	10-30% of reuse rate: 20/100 30-60%: 50/100 60-90%: 80/100 More than 90%: 90/100

Table 3-11 | Major Cases of Big Water Quality Excess Charges

(Unit: Million Won, 2005 Standard)

Business Name	Charges	Locations	Notice
8 companies	19,261		
Yuchang Corporation	6,401	Bucheon	
Dongducheon Leather Industrial Business Corporation	3,661	Dongducheon	
Jeil Plating Industry Co., Ltd	3,192	Daegu	
HN Co., Ltd	2,152	Ansan	Loss due to non-payment by administrative measures
Ace Electronics Co., Ltd	1,513	Gwangju	
Halla Plating	1,297	Daegu	
Changseong Metal	531	Busan	
Samil Metal	514	Busan	

Data: Ministry of Environment

90% of the collected money is used for water quality improvement business and environmental technological development on the environmental improvement mid-term general plan. For private sectors, supports are given to the localization of environmental industry and technological development fund. 10% of the charges collected by the Ministry of Environment is given to each province and listed as general account budget. For the charges collected by cities and counties, the province redistribute to cities and counties.

2. Major Content and Operation Experience of the Environmental Improvement Charging System

2.1 Background of Introduction

Environmental improvement charging system imposes charges on facilities and vehicles that provide direct causes of environmental contamination by emitting massive amount of pollutants in the course of distribution and consumption. The Environmental Improvement Expanses Liability Act was established in 1991 and the environmental improvement charging system was introduced, in which polluters pay the costs necessary for processing the contamination.

The objects of imposition are the facilities and cars that provide the direct causes of environmental contamination by emitting massive amount of pollutants in the course of distribution and consumption. Facilities include large buildings of more than 300 pyungs as well as restaurants and lodging houses located in urban areas, natural environment preservation areas and tourist resort areas. Cars include the diesel vehicles around the country.

The environmental improvement charging system is by nature an economic guidance system based on the principle of charging on causers and plays an important part as a financial resource for environmental investment. In the environmental improvement charging system, the principle of charging on causers and the principle of limit regulation are applied.

The environmental improvement charging system was introduced as a need emerged to secure enough environmental improvement project cost (2,500 billion won of financial shortage took place for the 5 Year Environment Improvement Mid-Term General Plan in 1991). Most of the money was used for sewage processing plant, livestock waste water processing plant, high quality water processing plant and so forth. The environmental improvement charging system is considered to be a successful system in the aspect of raising the fund necessary for environmental investment.

The environmental improvement charge in the area of air was supposed to be imposed on automobile fuel (diesel) at the time of introduction. As the problems of price increase and resistance against paying taxes were raised from financial ministries and politicians, however, it was limited to the field of consumption and distribution such as diesel vehicles

(per cc) and facilities. As the transportation energy environment tax is introduced and pollutants from diesel vehicles are decreased with the improvement of technology, it can be integrated with the transportation energy environment tax or can be changed to carbon tax or environment tax when the transportation energy environment tax is abolished in 2012. However, the amount of annual charge is 650 billion won and alternative financial resources are needed to abolish the environmental improvement charge. However, it is difficult in a practical sense.

Water quality area is duplicated with the sewage fee and the charges on diesel vehicles are better to be imposed on car fuel. In case of developing nations, however, securing of financial resources is more urgent for environmental improvement. Therefore, it is necessary to revise the same charging system to fir the situation of the nation. In case of the environmental improvement charges imposed on diesel vehicles, the original plan was to implement it for about 10 years until the necessary fund is raised and then change to the charges on car fuel. As the tax office worried about consumer price increase and resisted the plan, however, the charges are still imposed on diesel vehicles at the moment.

In addition, Korea has the past of low imposition and collection rates. If the low imposition rate is caused by the basic charges, it is proper to raise the rate gradually by reflecting the price increase rate. However, the pollutant emission inhibition effect through the adjustment of basic charging rate is small. As the basic charges are imposed to inhibit the amount of pollutants under a certain level, the guidance system to reduce the emission of pollutants is small. It is necessary to distinguish clearly whether the imposition rate for preventing contamination is low or whether the imposition rate for supplying financial resource is low. On the other hands, facilities have high collection rates but do not show 100% collection rate because of bankruptcy, delayed payment, management difficulty and so forth. In case of water quality emission charges, the collection amount is so large that it may cause closure, bankruptcy, administrative lawsuit and so forth. Therefore, the collection rate is low.

In addition, another reason for low collection rate is the delay of losses due to nonpayment for the past violations. Regarding the collection rate for diesel vehicles, the collection rate of the environmental improvement charges is low due to aged vehicles, change of registration, destitution, errors in issuing the bill, change of workplace, resistance to paying and so forth.

Table 3-12 | Base for Imposing Environmental Improvement Charges

Category	Base Law	Summary of Regulations
1. Act	Article 9 of the Environment Improvement Expenses Liability Act	Decide the matters about imposition and collection
2. Enforcement Decree	Article 8 of the Environment Improvement Expenses Liability Act	Decide the range of imposition about facilities and cars
3. Directive	Imposition of environmental improvement charges, collection work process regulation	Define the matters necessary for payment

After the first revision on December 31st, 1993, the environmental improvement charge has experienced 8 revisions. As of November 19th, 2011, it is being operated through the 9th revised enforcement decree. <Table 3-13> shows the revised categories, revised plans and reasons for revision from 1st and 8th revision.

Table 3-13 | General Revision of 1st to 8th Enforcement Decrees

Classification	Category	Revised Plan	Reason for Revision
First	Expand the area of imposition on facility Exemption object divided facility Facility use classification and adjustment	Add tourist site and hot spring Less than 50m^2 of total floor space 29 to 18	Equality among regions Expand the exemption objects Smooth work of calculating charges
Second	Expand the size of imposition object facility Reduce and abolish the objects for exemption and reduction	More than 160m^2 regardless of business type Residential facility, possessed by foreign government Exempt only facilities, abolish reduction system	Unify the facility imposition object standard Equality in the public sector

Classification	Category	Revised Plan	Reason for Revision
Third	Range of exemption object facility Joint possessed facility exemption range Expand the exemption objects	Concrete definition about the range of military facility Impose in case of more than·160m^2 Reduce the amount equivalent to the air and water quality basic charge	Establish the concept of military facility Equality among imposition facilities Remove the duplicated imposition
Fourth	Calculation method for water quality improvement charge	Apply the inducement coefficient for each use	Faithful to the principle of charging on causers
Fifth	Range of exemption object facility Calculation method	Adjacent facility to the rural facility is not included Apply the same local coefficient of eup, myun and dong in a combined urban and rural city	Rational adjustment of imposition object Equality among regions
Sixth	Adjust local coefficient	Apply other coefficient for eup and myun where the provincial government building is located.	Rational adjustment of imposition standard
Seventh	Environmental contamination prevention project cost	Delete	Arrange the legal system
Eighth	Expand the condition for frequent imposition Expand the range of supplying the collection and distribution cost. Legalize the standard to calculate the floor space Adjust the fuel coefficient of facility	Request or direct right of imposition object Maximum 20% in case of collecting more than 10% + a certain collection rate Define directly in the enforcement decree Second stage of diesel fuel among fuel coefficients	Convenient payment by people Give incentives according to collection rate Arrange the legal system Reflect the state of supplying the low sulfur diesel

2.2 Major Content and Operation Experience

The environmental improvement charges are imposed on facilities and cars that provide direct causes of environmental contamination by emitting massive amount of pollutants in the course of distribution and consumption. In case of facilities, charges are imposed on facilities such as stores, office and so forth with the total floor space of more than 160 ㎡ with roofs, walls and pillars. In case of cars, charges are imposed on diesel vehicles around the country registered according to the automobile management act. Production and manufacture facilities and gasoline cars that are equipped with three way catalytic devices are exempt. Facilities possessed by foreign government and residential facilities such as cars, individual houses, apartment houses and so forth are also exempt.

Table 3-14 | Imposition Objects of Environmental Improvement Charges

Imposition Condition and Imposition Objects	Person Liable to Pay	Related Laws
1. Facility Building with the total floor space of more than 160m² 2. Car Diesel vehicle registered according to automobile anagement act	○ Facility: Owner (can be transferred to the occupier) ○ Car: Owner	Article 9 of the Environment Improvement Expenses Liability Act

2.2.1 Facility

The environment improvement charges are calculated for facilities by applying different rates for purpose, fuel type and location based on the standard of fuel and water use and different calculations are used for the emission of air pollutants and the emission of water pollutants.

In case of facilities, the method to calculate the environmental improvement charges in case of emitting air pollutant is shown in <Table 3-15>.

Table 3-15 | Method to Calculate the Environmental Improvement Charges in case of Releasing Air Pollutants from Facilities

Improvement Charge =	Fuel Use x	Imposition Amount per Unit x		Fuel Coefficient x	Area Coefficient
	Actual amount of use x liquid fuel exchange coefficient	Standard imposition amount x	(Imposition amount calculation index)		
	* Liquid fuel exchange coefficient · LNG(Sm^3): 1.14 · LPG(kg): 0.76 · Diesel (l): 1 · Heavy oil (l): 1.08 · Smokeless coal, charcoal (kg): 0.49 · Smoke coal (kg): 0.72	· Less than 1,00: 13 · 1,000-2,000: 15 · 2,000-4,000: 16 · 4,000-6,000: 18 · 6,000-10,000: 20 · 1,000-2,000: 22 · 1,000-2,000: 24 · 1,000-2,000: 27 · More than 600,000: 29	1.599 (2005)	· LNG,LP: 0.16 · Heavy oil: 0.87-1.40 · Heavy oil: 1.62-3.67 · Smokeless coal, charcoal, smoke coal: 3.67	· Special city: 1.53 · Metropolitan city: 1.00 · Provincial office area: 0.97 · Urban area: 0.79 · Other areas: 0.40

In case of facilities, the calculation method for environmental improvement charges in case of emitting water pollutant is shown in <Table 3-16>.

Table 3-16 | Method to Calculate the Environmental Improvement Charges in case of Releasing Water Pollutants from Facilities

Improvement Charge =	Water Use Amount x	Imposition Amount per Unit x		Contamination Causing Coefficient	Area Coefficient
		Standard imposition amount x	(Imposition amount calculation index)		
		· Less than 400: 79 · 400-800: 87 · 800-1,600: 97 · 1,600-2,400: 108 · 2,400-4,000: 120 · 4,000-8,000: 132 · 8,000-40,000: 145 · 40,000-240,000: 160 · More than 240,000: 176	1.599	· Bathroom: 0.08 · Restaurant: 0.55 · Massage parlor: 0.15 · Indoor pool: 0.07 · Medical facility: 0.34 · Gym: 0.67 · Work facility: 1.00 · Lodging facility: 0.38 · Large store: 1.00 · Movie theatre: 1.29 · Transportation facility: 0.67 · Tourist lounge: 0.85 · Other facilities: 0.85	· Special city: 2.07 · Metropolitan city: 1.00 · Provincial office area: 0.68 · Urban area: 0.67 · Other areas: 0.57

Regarding the imposition amount calculation index, the minister of environment is announcing the imposition amount calculation amount every year reflecting the price increase rate of the previous year according to the Paragraph 1 and Paragraph 3 of the Article 14 of the Environment Improvement Expenses Liability Act Enforcement Decree. Charge calculation index is the index to reflect the actual pollutant processing cost by considering the price increase rate of the previous year when calculating the environmental improvement charge, and it is calculated by the charge calculation index of the previous year multiplied by the price change index considering the price increase rate of the previous year {price change index = 1 + price increase rate (average of producer price increase rate and consumer price increase rate)}. The charge calculation index is increasing continually after the installation of the charge in 1992.

Table 3-17 | Calculation Index for Annual Imposition of the Environmental Improvement Charges

Classification	'92	'93	'94	'95	'96	'97	'98	'99	'00	'01	'02	'03	'04	'05
Calculation Index	1.000	1.042	1.073	1.121	1.172	1.218	1.269	1.393	1.396	1.422	1.466	1.490	1.531	1.599
Application Period	~'92. 12.31	~'93. 12.31	~'94. 12.31	~'95. 12.31	~'96. 12.31	~'97. 12.31	~'98. 12.31	~'99. 12.31	~'00. 12.31	~'01. 12.31	~'02. 12.31	~'03. 12.31	~'04. 12.31	~'05. 12.31

2.2.2 Diesel Vehicle

The environmental improvement charge on diesel vehicle is calculated as follows by considering the imposition amount per each vehicle (= standard imposition amount x imposition amount calculation index), contamination causing index based on cc, vehicle age coefficient based on the aging of the vehicle and the area coefficient based on administrative district.

Table 3-18 | Calculation Index for the Imposition of the Environmental Improvement Charges for Diesel Vehicles

Diesel Vehicle Environmental Improvement Charges	=	Basic imposition amount for each vehicle (Standard imposition amount x imposition amount calculation index)	×	Contamination causing coefficient (based on cc)	×	Vehicle index (vehicle aging)	×	Area coefficient (for each administrative district)

The basic amount of the environmental improvement charge per a car was calculated by the three way catalyst device of a gasoline car. In case of a general car, it was 8,100 won in 1993. However, the effect of guidance to the reduction of contamination and the development of clean technology was small as the basic charge on diesel vehicle was too low. Therefore, the basic charge on general vehicle was increased to 20,250 won from 1997. In case of business vehicle, it was introduced in 1996 and was increased to 20,250 won just like general vehicle. The basic imposition amount for general small cargo vehicles and medium cargo vehicles under 3,000cc was 15,190 won from January 1st, 2008. However, it was exempt for the cars that are manufactured to fit the emission limit standard of diesel vehicle applied after January 1st, 2006 and are less than 3 years old from new vehicle registration date.

Table 3-19 | Standard Imposition Amount of Improvement Charges for Cars

Period of Application	From January 1st, 1995 to December 31st, 1996	After January 1st, 1997
Standard Imposition Amount (Won/Biannually)	12,150	20,250

Data: Ministry of Environment Environmental Improvement Charge Work Manual 2005

The imposition calculation index of the environmental improvement charge for car is calculated and announced every year according to the Environment Improvement Expenses Liability Act Enforcement Decree. In 2006, the imposition amount calculation index was 1.643 and contamination causing coefficient is based on the vehicle's level of causing contamination and is classified by the total cc of the engine. With the standard of vehicles under 2,000cc, 1.24 is applied to 2000~2,500cc, 1.57 is applied to 2500~3,500cc, 2.64 is applied to 3,500~6,500cc and 4.50 is applied to 6,500~10,000cc. For vehicles of more than 10,000cc, 5.00 is applied.

Table 3-20 | Imposition Coefficient of the Improvement Charges for Each Vehicle Type

Total Engine Displacement Volume (cc)	Contamination Causing Coefficient
Less than 2,000	1.00
2,000~2,500	1.25
2,500~3,500	1.75
3,500~6,500	2.64
6,500~10,000	4.50
More than 10,000	5.00

Data: Ministry of Environment Environmental Improvement Charge Work Manual 2005

The area coefficient of the environmental improvement charge on diesel vehicle are divided into 5 levels just like the air quality improvement charge including special city (1.53), metropolitan city (1.00), provincial office area (0.87), urban area (0.85) and other areas (0.40). If the area coefficient is higher than 2, the highest area coefficient is applied. For metropolitan city and eup and myun areas in a combined city of urban and rural areas, the area coefficient for other areas is applied. For the area coefficient for a vehicle used for cargo vehicle transportation business according to the Trucking Transport Business Act and registered special city, metropolitan city or provincial office area as the home of usage, the area coefficient of urban area is applied. For the area coefficient of a vehicle used for cross-country bus transportation and special passenger vehicle transportation business and registered special city, metropolitan city or provincial office area as the home of usage, the

area coefficient of urban area is applied. For country area, area coefficient for other areas with the population of less than 100,000 is applied.

Table 3-21 | Local Coefficient of Environmental Improvement Charges for Diesel Vehicles

Area	Special City	Metropolitan City	Provincial Office Area	Urban Area	Other Areas
Area Coefficient	1.53	1.00	0.87	0.85	0.40

Data: Ministry of Environment, Environmental Improvement Charge Work Manual, 2005

As cars emit more pollutants as they get old, it must be considered when calculating the environmental improvement charges on diesel vehicles. For the diesel vehicles that satisfy the manufactured vehicle emission limit standard reinforced from 2006, therefore, the improvement level is considered and reduced the improvement charge by half for 3 years and vehicle age coefficient was adjusted rationally so that the air pollution level of diesel vehicles that are more than 10 years old can be reflected properly.

Table 3-22 | Vehicle Age Coefficient according to the Level of Aging

Vehicle Age	Less than 3 Years	3 to 4 Years	4 to 6 Years	6 to 8 Years	8 to 10 Years	More than 10 Years
Vehicle Age Coefficient	0.5	1.00	1.04	1.08	1.12	1.16

Data: Ministry of Environment, Environmental Improvement Charge Work Manual, 2005

Regarding the method to calculate the environmental improvement charges on diesel vehicles, the imposition amount of the environmental improvement charges for each diesel vehicle type and location as of 2000 is shown in <Table 3-23>. For example, the improvement charges for Galloper (6 people) and cargo vehicle (1 ton) of 2,001cc~2,500cc are 63,620 in the special city, 41,580 won in metropolitan cities, 40,330 won in provincial office areas, 32,850 won in urban areas and 16,620 won in other areas. In case of bus (45 people) of more than 10,000 cc and cargo vehicle (15 ton) of more than 10,000cc, the charges are 245,510 in the special city, 166,350 won in metropolitan cities, 161,350 in provincial office areas, 131,400 won in urban areas and 66,500 won for other areas.

Table 3-23 | Environmental Improvement Charges for Each Car Type and Region (2006 Standard)

(Unit: Won/Biannually)

Displacement Volume (cc)	Vehicle Type	Special City	Metropolitan City	Provincial Office Area	Urban Area	Other Areas
Less than 2,000		50,900	33,270	32,270	26,680	13,300
2,001~2,500	Galloper (6 people) Cargo vehicle (1 ton)	63,620	41,580	40,330	32,850	16,620
2,501~3,500	Bus (12 people) Tow truck (2.5 ton)	89,080	58,220	56,470	45,990	23,270
3,501~6,500	Bus (25 people)	134,380	87,830	85,190	69,370	35,110
6,501~10,000	Cargo vehicle (8 ton)	229,060	149,710	145,210	118,260	59,850
More than 10,001	Bus (45 people) Cargo vehicle (15 ton)	245,510	166,350	161,350	131,400	66,500

Note: Standard of vehicle age is less than 4 years

2.2.3 Reduction of Charges

The objects of reduced environmental improvement charges and the reduction rates can be summarized as in <Table 3-24>.

Table 3-24 | Reduction Object and Reduction Rate of the Environmental Improvement Charges

Reduction Object	Reduction Rate (%)
- First, facilities and cars that belong to foreign government and international organization	100
- Second, individual house, apartment house and dormitory	100
- Third, facility with the divided possession space of less than 160㎡	100
- Fourth, car that emits a significantly small amount of emission gas according to the announcement by the minister of environment	100
- Fifth, car that is displayed by car salesperson for sale according to vehicle management law	100
- Sixth, facility to which basic charge is given according to the Article 15 of the Clean Air Conservation Act and the Article 13 of the Water Quality Conservation Act	Amount equivalent to the basic charge
- Seventh, facility where tap water or rainwater using device is installed according to the tap water law	25% of the water contamination charge in the first half

2.2.4 Imposition and Collection State

The imposition and collection state of the environmental improvement charge is shown in <Table 3-25>.

Table 3-25 | Imposition and Collection of the Environmental Improvement Charges for Each Year

Period	Number of Impositions	Amount of Impositions (Million Won)	Amount of Collections (Million Won)	Collection Rate (%)
1995	4,931,640	128,793	113,386	88
1996	5,527,012	178,380	157,724	88.4
1997	6,427,389	250,333	218,895	87.4
1998	6,756,181	320,566	267,280	83.4
1999	6,729,194	355,662	297,591	83.7
2000	7,740,998	409,364	341,849	83.5
2001	8,614,903	464,857	408,785	87.9
2002	9,741,832	520,094	452,561	87.0
2003	10,892,909	586,368	482,923	82.4
2004	11,752,218	643,198	524,113	81.5
2005	12,531,394	696,016	569,661	81.8
2006	12,894,061	717,566	577,089	80.4
2007	13,345,134	731,292	571,400	78.1
2008	13,350,590	683,669	553,312	80.9
2009	13,332,640	666,023	546,189	82.0

Data: Ministry of Environment Environmental Statistic Portal (http://stat.me.go.kr)

The number of impositions of the environmental improvement charge is 13,332,640 cases in 2009 and the amount of impositions was 670 billion won. Then the amount of collections was 550 billion won showing 82.0% of collection rate. Another reason for such low collection rate is frequent civil petitions. Major civil petitions are shown in <Table 3-26>.

Table 3-26 | Major Civil Petitions

Title of Civil Petition	Major Content
Basic living standard recipient	Discount on the environmental improvement charge for basic living standard recipient
Integrated management of the charges on commercial building	Integrate management of the environmental improvement charge, traffic charge and street occupancy charge by a single department
Imposition of school environmental improvement charge	Make elementary school exempt from the environmental improvement charge
Partial exemption from the environmental improvement charge	Reduce the environmental improvement charge for the water evaporation from cooling tower
Imposition of the environmental improvement charge	Imposition of the environmental improvement charge in case of separate registration (owner of less than 160㎡)
	Change of facility owner (facility owner: Nation and management subject are not decided)
	Whether to include the underground parking space to the overall space of the facility
	Whether to apply the environmental improvement charge on golf facility
	Many houses use water from apartment and stores problem of sharing a tap water meter
Enhance the collection and distribution rate	Induce to the investment in the environmental improvement projects in the polluted area
Method to impose the environmental improvement charge	Make a law so that credit card payment can be possible
Improvement of collection system	Exempt for superior environment-friendly building, impose on actual occupier of the facility

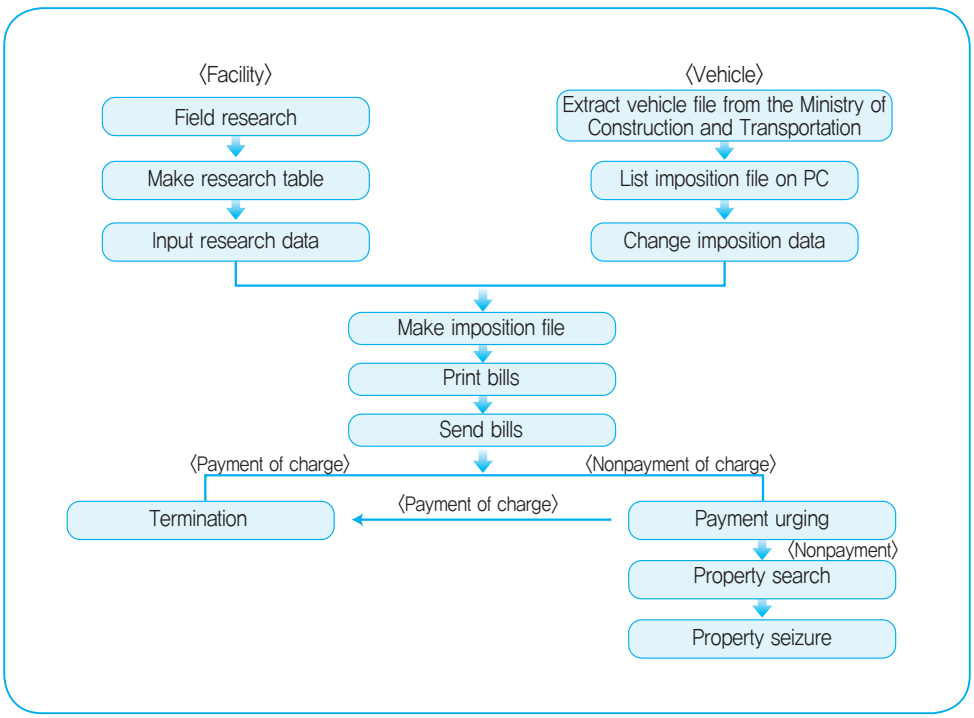
In case of facilities, the imposition amount is decided by the purpose of use, fuel, amount of water use and location. In case of cars, it is decided by displacement volume, year of make and place of registration. The imposition and collection of the environmental improvement charge are done biannually and the imposition dates are June 30th and December 31st. The first half is from January 1st to June 30th and the second half is from July 1st to December 31st.

Regarding the receiving of the environmental improvement charge, the collector notice the person responsible to pay and the charge paid by the person to a bank in city, gun or gu is then transferred to the safe bank and then the money must be paid to the relevant special

account until 10th of the month of the collection and the safe bank must notify the result of payment to the collector, along with the payment receipt until the next day of the payment. Upon reception of the charge payment notice from the safe bank, the collector shall immediately transfer the money to the special accounts for the environmental improvement completing the reception procedure.

The imposition and collection work is committed to governor (mayor, county head and district officer). One tenth of the collected money is distributed as collection cost and the rest goes to the special accounts for the environmental improvement. Letters of notice that urges payment are given for unpaid charges. When the charge is still not paid, the imposition of charge shall be terminated through property search and seizure (refer the Figure 3-1).

Figure 3-1 | Imposition and Collection Flowchart of the Environmental Improvement Charges



Data: Refer the Ministry of Environment (2000)

The environment improvement charges are then used for supporting the air and water quality improvement project conducted as a mid-term plan. In detail, it is used for clean water supply project, sewage water arrangement project, sewage processing plant, livestock waste water processing plant, high quality water processing plant, environmental base facility operation cost and so forth. In addition, the money is used for supporting the

environment related research fund and natural environment preservation project including the development of low pollution technology and it is also used for the development of low contamination and non-pollution processing technology such as vehicle emission gas reduction technology as well as the development of global environmental preservation technology such as CFC alternative material development and so forth. It is also used for the environmental contamination prevention project cost, environmental science technology development cost, environmental policy research and development cost and so forth.

3. Major Content and Operation Experience of the Extended Producer Responsibility (EPR) System

3.1 Background of Introduction

In the past, many countries in the world tried to solve the problem of waste by landfill and incineration, but it not only increased the demand for fund for the building and operation of the facility but also evoked strong resistances from residents. In addition, the atmosphere of saving resources is created due to the increase of prices for raw materials and the safe handling based waste management policy faced fundamental change. In other words, a polity was promoted to reduce waste in the course of design and manufacture of products and reuse the produced waste.

Korea began to promote the policy of waste reduction and recycling in 1990s. The garbage separate collection was first started in 1991, and waste charge and waste deposit system were first implemented in 1993. In 1995, the garbage limit system was introduced, which was a significant system in the management of waste. As a result of such recycling policy, significant achievements were made. As the recycling market is directed by the economic motivation of the recycling business owners and the recycling business often faced difficulties due to economic situation; however, lots of waste is not recycled but buried or incinerated.

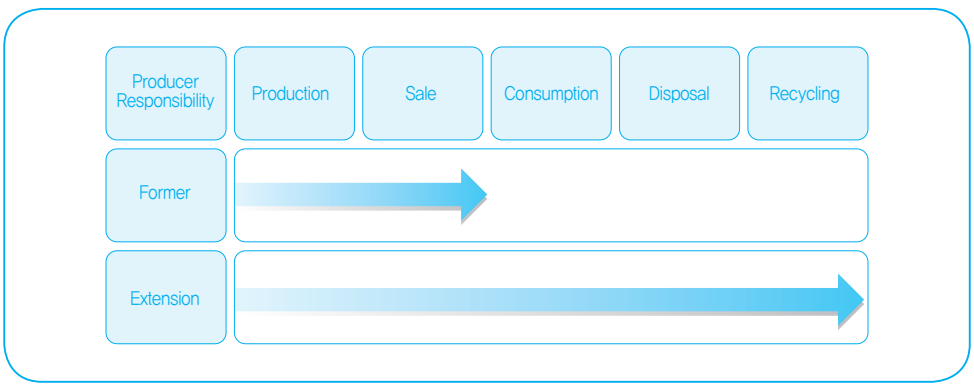
Until now, with the implementation of garbage limit system, people have been actively participating in the separate collection of waste contributing to the reduction and recycling of waste. On the other hand, producers of the original products had no special role beside partial financial contribution such as paying deposits and charges. Therefore, policy shift was made to expand and reinforce the responsibility of producers in the management of waste and extended producer responsibility suggested by OECE was introduced. Then the extended producer responsibility that fits Korea' situation is invented and implemented. Through the voluntary agreement between government and producers and exemplary implementation of recycling business by producers from 2000, the framework of the system was prepared. In 2002, the Act on the Promotion of Saving and Recycling of Resources was revised and this system began to take full effect as the producer's responsible recycling amount was announced in 2003.

EPR system is contributing to the enhancement of recycling rate (producer's load can be reduced and the recycling rate can be enhanced by imposing the responsible recycling amount that can be achieved) and to the raising of recycling business (maximize the raising of recycling business through the producer's direct support to the recycling business). When the recycling record is different from actual recycling record, recycling charge is imposed for the difference. For the unfulfilled amount, 115 to 130% of the recycling cost for the product packaging responsible for recycling is imposed. The money raised by the imposition of recycling charge is used for the recycling of waste. With the implementation of EPR system, the recycling record is increasing continually every year. In 2007, 1,389,000 ton was recycled marking 48.1% increased compared to 2002 and it is considered to be a successful environmental charging system in Korea.

3.2 Major Content and Operation Experience

In the past, producers produced products that can be recycled easily and took the responsibility until the products are sold and left the responsibility of handling the waste to the consumers. In the extended producer responsibility (EPR) system, however, the recycling of the waste after use is extended to the responsibility of producers.

Figure 3-2 | The Concept of Extended Producer Responsibility (EPR)



Data: Korea Environmental Corporation

The legal responsibility for the recycling of waste lies on producer but it does not mean that producers must take full responsibility from collecting to recycling. Instead, it is a system, in which consumers, local governing bodies, producers and the government take certain roles and the producers who have the biggest decision right in the design of the product and the selection of packaging shall take the central role in the recycling system.

In Korea, EPR system is not a whole new concept but the deposit system established in 1992 began to be implemented from January 1st, 2003 after being amended and improved according to the principle of extended producer responsibility.

In the EPR system, the government gives the amount of recycling to producers and producers organize recycling business friendly society and fulfill the responsibility of recycling. When the recycling responsibility is not fulfilled, maximum 1.3 times of the actual collecting and recycling cost is imposed on the producer. List of recyclable items are shown in <Table 3-27>.

Table 3-27 | Items Subject to Recycling

Object Items	Detailed Items	Notice
Ⅰ. Product - Electronic products	1. Television 2. Refrigerator 3. Washing machine (home use) 4. Air conditioner (car air conditioner is not included) 5. Personal computer (monitor and keyboard are included) 6. Audio 7. Mobile phone (battery and recharger are included) 8. Printer 9. Copying machine 10. Facsimile	 Implemented on January of 2006 Implemented on January of 2006 Implemented on January of 2006
- Batteries	11. Mercury battery 12. Silver oxide battery 13. Nickel cadmium battery 14. Lithium battery (only first battery)	
- Tires	15. Tire	
- Lube Oil	16. Lube Oil	
- Fluorescent Lamp	17. Fluorescent lamp	
Ⅱ. Packaging - Packaging that contains food, beverage, agricultural product, seafood, farming product, detergent, cosmetic product, medical product, butane gas, pesticide or sterilizer	17. Fluorescent lamp 18. Paper package 19. Glass bottle 20. Metal can (iron can, aluminum can) 21. Synthetic resin packaging	

Data: Korea Environmental Corporation

In 2003, items subject to recycling were designated including 4 packaging materials and 11 products. In 2009, 4 packaging materials and 20 products were included. With the establishment of environmental guarantee system, 10 electric and electronic products are managed under the environment guarantee system.

Table 3-28 | Items Subject to Recycling by Year

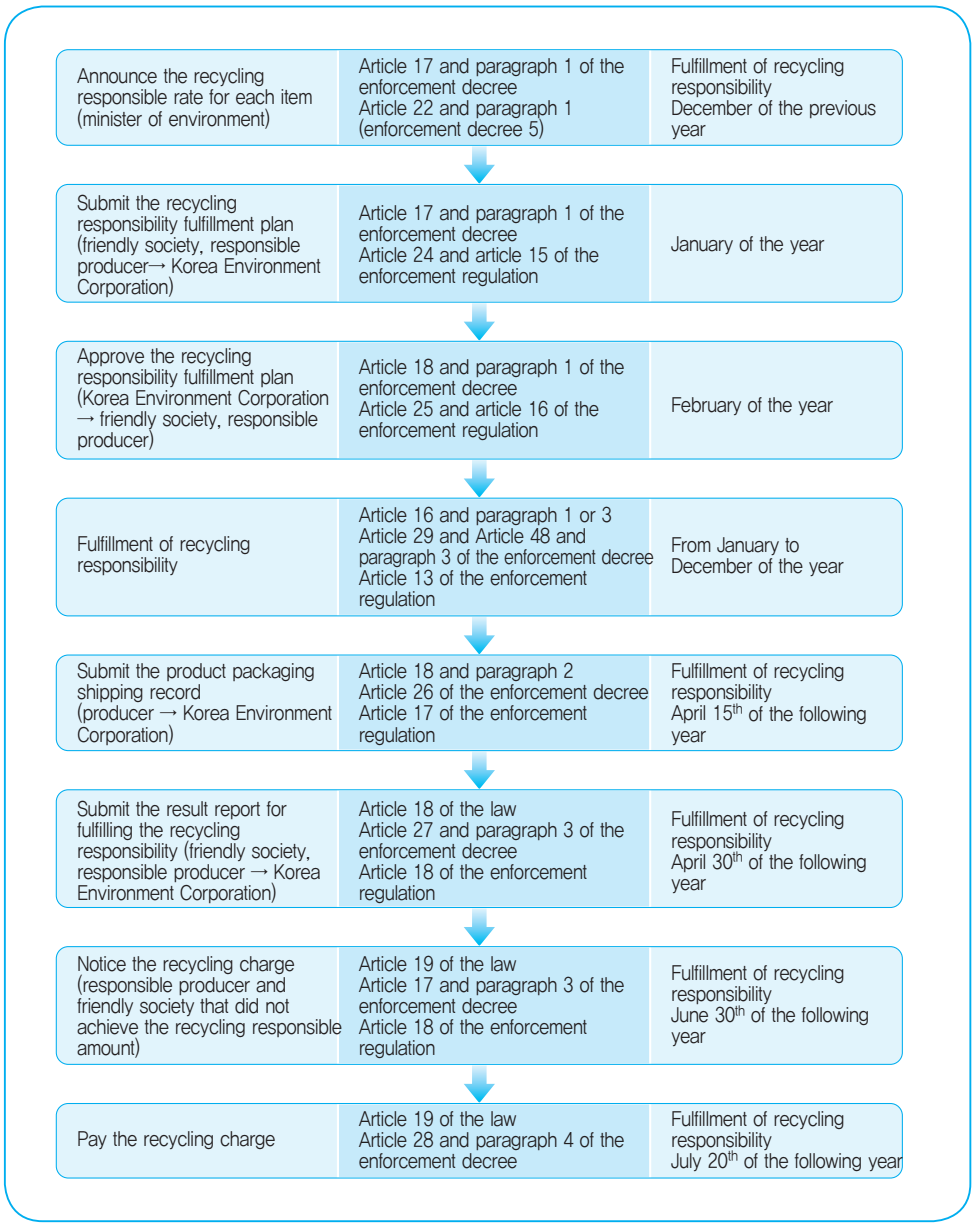
Year	Total	Packaging Material	Product
2003	15	4 (paper package, glass bottle, metal can, synthetic resin)	11 (Lube oil, tire, mercury battery, silver oxide battery, lithium battery, nickel cadmium battery, television, refrigerator, washing machine, air conditioner, personal computer)
2004	16	4 (synthetic resin and film are included)	12 (fluorescent lamp is newly added)
2005	18	4	14 (audio and mobile phone are newly added)
2006	21	4	17 (printer, copying machine and facsimile are newly added)
2007	21	4 (cosmetic product and glass bottle are included)	17
2008	24	4	20 (manganese battery, alkali manganese battery and nickel hydrogen battery are newly added)
2009	24	4 (cloth, paper product, rubber gloves, packing material, temporary shopping bag, electric tool and film packaging material are included)	20

※ From 2008, the 10 electronic items are manage by the Act on Resource Circulation of Electrical and Electronic Equipment and Vehicles

Data: Korea Environmental Corporation

The data about the product packaging shipping record until March of the following year and the documents to be submitted include documents that can prove the product shipping record such as copy of business registration, settlement report and so forth (documents that can prove the content of import in case of import) and the calculation base data for the weight (volume) of the product package must be submitted. The fulfilling procedure of the EPR system is shown in [Figure 3-3].

Figure 3-3 | The Execution Procedure of Extended Producer Responsibility (EPR) System



Data: Korea Environmental Corporation

The Minister of environment announces the recycling responsible rate until the end of the previous year by considering the product package's shipping amount, separation collection amount, recycling record, recycling condition and so forth. The Minister of environment announces the recycling responsible rate until the end of the previous year by considering the product package's shipping amount, separation collection amount, recycling record, recycling condition and so forth, and the calculation formula for concrete recycling responsibility rate is as follows. The recycling responsibility rate is calculated by the product package shipping amount of the year multiplied by the recycling responsibility rate presented above.

As shown in <Table 3-29>, all business owners are included in the recycling responsible producers regardless of manufacture or import scale concerning products. Concerning package, manufacturers, sellers and importers with a certain standard are included.

Table 3-29 | Producers that Must Recycle

Classification	Content	Object
Product	All manufacturers and importers who manufacture or import products that are the subjects of recycling responsibility	All business owners regardless of manufacture or import scale
Packaging Material	Manufacturers, sellers and importers who use the object packaging materials to product packaging Manufacturers and importers of the object packaging materials	Manufacturers and sellers: Those who have the annual sale amount and shipping amount that are more than a certain standard Importers: Those who have the annual import amount and shipping volume that are more than a certain standard

※ Total annual sale: Total annual sale amount of the responsible business including all sale amounts besides the recycling responsible items
Annual import amount: Total annual import amount of responsible business with the standard of CIF price and it includes other import amounts besides recycling responsible items
Data: Korea Environment Corporation

In case of packaging material, business owners under a certain scale are included as objects but the recycling duty is exempt for them. Therefore, they have the responsibility to mark separate discharging on the packages.

Table 3-30 | Formula to Calculate the Rate of Responsibility to Recycle

(Recycling responsibility rate of the previous year x weight 1)	+	(Recycling responsibility rate of the year before the previous year x weight 2)	+	(Recycling responsibility rate of the year before the year before the previous year x weight 3)	+	Coordination coefficient

※ Weight 1: 1 in the second year, 0.6 in the third year and 0.5 after the fourth year
Weight 2: 0 in the second year, 0.4 in the third year and 0.3 after the fourth year
Weight 3: (Recycling responsibility rate of the year before the year before the previous year x weight 3)

Regarding the submission and approval of recycling responsibility fulfilling plan, the recycling responsible producer and recycling business owners friendly society shall submit the recycling responsibility fulfilling plan until the end of the January of the year (within 30 days in case of first shipping or importing in the year).

Documents to be submitted include possession state of recycling facility (in case of commission, the agency's possession state of recycling facility), collection and transportation plan for the packaging of the recycling responsible items (in case of direct recycling) and document that can prove the legitimate recycling agent (in case recycling is committed).

Recycling responsibility can be fulfilled by direct recycling or recycling through commission to agent or the work can be commissioned to a recycling business friendly society or can be done by paying the charge. The objects of recycling responsible business owners include the manufacturers and importers of electronic product, tire, lube oil, fluorescent lamp, battery and so forth as well as the manufacturers and importers of paper pack, metal can, glass bottle, synthetic resin packaging material and so forth.

Recycling responsibility fulfilling result report must be submitted, and the recycling responsible producer and recycling business friendly society must submit the recycling responsibility fulfilling result report until the end of March of the following year. The documents to be submitted include a copy of management for collecting and recycling of product packaging materials of recycling responsibility (in case of commission, a copy of management book of the agent) and proving document about the recycling method and the method to observe the standard.

Recycling charge is imposed and collected in proportion with the amount of unfulfilled recycling responsibility. In case the recycling record is different from the actual recycling record, the charge is imposed on the difference. In case the recycling responsible producer did not submit the shipping record of the product package, charge is imposed on the entire amount of recycling responsibility. In case the method and standard of recycling for each product packaging material is violated, charge is imposed on the amount of violation.

For the unfulfilled amount, 115~130% of the recycling cost for the product packaging material is imposed and 5/100 of weight is imposed in case of delayed payment.

The collection rate of the recycling charge is low just like the collection rates of other charges. In 2009, 1,698 cases were collected among 3,486 impositions and only 5.2 billion won was collected in about 11.5 billion won of recycling charges marking 45.4% of collection rate.

Table 3-31 | Imposition and Collection Record of the Annual Water Quality Improvement Charges

(Unit: Case, Million Won, %)

	Imposition		Collection		Difference		Collection Rate
	Number of Cases	Amount (a)	Number of Cases	Amount (b)	Number of Cases	Amount	(b/a)
Total	13,357	44,386	10,464	24,582	2,893	19,804	55.3
2009	3,486	11,511	1,698	5,234	1,788	6,277	45.4
2008	2,578	8,401	2,267	4,129	311	4,272	49.1
2007	2,607	6,025	2,308	3,373	299	2,652	56.0
2006	2,207	6,542	1,974	4,204	233	2,338	64.3
2005	1,680	6,587	1,492	3,533	188	3,054	53.6
Before 2004	799	5,320	725	4,109	74	1,211	77.2

※ Recycling charge was first imposed in 2004

EPR is different from waste deposit system. Waste deposit system has the characteristic of passive cost payment whereas EPR system gives direct recycling responsibility on producers. The waste deposit system returns the deposit to the manufacturer when the recycling target is achieved after depositing a certain amount of money. In addition, the waste deposit system takes the method to impose deposits for 100% of the product shipping but EPR system gives recycling responsibility for a certain part of the shipping. <Table 3-32> is the summary of the difference between Waste Deposit System and Extended Producer Responsibility (EPR) System.

Table 3-32 | The Difference between Waste Deposit System and Extended Producer Responsibility (EPR) System

Waste Deposit System	EPR System
Impose deposit for 100% of the product shipping	Consider the recycling condition and give recycling responsibility to a certain part of the shipping
Indirect recycling responsibility (passive cost payment) - The manufacturer of the product packaging material deposits a certain amount of money and the deposit is returned according to the recycling record Recycling rate is low due to heavy load - Heavy load on business owners by imposing deposit on the entire shipping - Recycling guidance effect is small due to low deposit rate, recycling industry raising effect is small - Recycling industry support effect is small due to the collection of non-returned deposit into national accounts (55%)	Direct recycling responsibility (active cost producer responsibility) - Impose the recycling responsible amount on the manufacturer of product packaging material Recycling rate can be enhanced by minimum load - Load on the producer can be reduced and recycling rate can be enhanced by imposing the recycling responsible amount that can be achieved Maximize the recycling industry raise effect - Maximize the recycling industry raise effect as producer provide active support to recycling business

The role of each subject is important in EPR system. Consumers must discharge products and packaging materials separately so that they can be recycled, and the sellers of electronic products must collect the waste electronic products for free from the buyer of new products. In case of violation, recycling charge is imposed. Local governing bodies must arrange the basis for separate collection by installing separate collection boxes. Korea Environment Corporation must check the fulfilling of recycling responsibility, and the government must calculate and announce the recycling responsibility for each item every year.

Table 3-33 | The Role of Each Subject of the Extended Producer Responsibility System

Consumer Resident	Separate discharging of packaging materials - Discharge separately from general garbage so that the product packaging materials of recycling responsibility can be recycled
Producer	Fulfilling of recycling responsibility pay the recycling charge in case of not fulfilling the recycling responsibility The sellers of electronic products must collect the waste electronic products for free from the buyers of new products Attach when discharging the packaging materials separately
Local self-governing body (City, County, Gu)	Separate collection of packaging materials that are discharged separately Promotion among local residents about separate discharging Build the base for separate discharging by installing separate collection boxes
Korea Environment Corporation	Matters about system executions such as receiving and approving the producer's shipping amount and recycling responsibility fulfilling plan, collecting the recycling charge and so forth Check the fulfilling of recycling responsibility
Government (Ministry of Environment)	Establish and revise related laws Calculate and announce the recycling responsibility rate for each item every year Approve the establishment of recycling business friendly society

Data: Korea Environment Corporation

The record of EPR system in Korea is shown in Table 3-34. Through the implementation of Waste Deposit System in 2002, 940,000 ton of waste was recycled and 1,400,000 ton of waste was recycled in 2009. The recycling amount of packaging materials was 640,000 ton and the recycling amount of product wastes was 400,000 ton in 2003. In 2009, however, the former is increased to 860,000ton and the latter is increased to 510,000ton. Regarding the operation of deposits in 2002, 1,360,000 ton was achieved from 940,000 ton marking 45.2% increase and the EPR system achieved the recycling of 8,790,000 ton for 7 years.

The main reasons include the internal factors such as improvement of separate collection system for each item, securing of recycling facilities, active promotion and so forth with the implementation of EPR system and the external reasons such as increase of oil price, raw material crisis and so forth.

The shipping amounts between packaging materials and products are almost same (2~10% change). Concerning the recycling rates compared to the shipping amount, however, products (35%~39%) marked 20~36% lower record than packaging materials (55~75%); therefore, improvement measures are necessary to enhance the recycling rate in the future.

Table 3-34 | EPR Recycle Record

(Unit: Thousand Ton)

Classification	Implementation of Deposit	Implementation of EPR				
	2002	Total	2003	2005	2007	2009
Total	938	8,797	1,047	1,249	1,384	1,362
Increase and/or Decrease Rate	-	-	11.6%	11.2%	9.5%	0.4%
Packaging Material	583	5,525	643	798	866	855
Increase and/or Decrease Rate	-	-	10.3%	13.8%	8.8%	1.3%
Product	355	3,272	404	451	518	507
Increase and/or Decrease Rate	-	-	13.8%	6.9%	10.7%	1.0

Concerning the legal use of the producer responsibility charge, the money is transferred as the tax revenue of the special accounts for the environmental improvement according to the Environment Improvement Expenses Liability Act and then used for waste recycling project, support for the construction of waste processing plant, research and technological development to reuse and reduce waste effectively, recollection, reuse and processing of waste by local governing body and so forth.

Table 3-35 | Legal Use of EPR Charges

Purpose of Use	Related Laws
Recycling charge and weight are listed as tax revenue of the special accounts for the environmental improvement according to the Environmental Improvement Expenses Liability Act.	Article 19 and Paragraph 5 of the Act on the Promotion of Saving and Recycling of Resources
Waste charge and recycling charge are used for the purpose of each category 1. Waste recycling project and support to the construction of waste processing plant 2. Research and technological development to reuse and reduce wastes effectively 3. Support local governing bodies to collect, reuse and process wastes 4. Purchase and store recyclable resources 5. Support the project to encourage the recycling of resources 6. Distribute the cost to collect waste charge (including weight) or recycling charge (including weight)	Article 20 of the Act on the Promotion of Saving and Recycling of Resources

Chapter 4

Method to Apply the Environmental Charging System to Developing Nations

1. Matters to Consider in Applying to Developing Nations
2. Method to Apply to Developing Nations

Method to Apply the Environmental Charging System to Developing Nations

1. Matters to Consider in Applying to Developing Nations

In order to deal with the problem of serious environmental contamination in developing nations, it is necessary to introduce the emission charging system, environmental improvement charging system and EPR system that are being operated successfully in Korea. As the operation of the environmental charging system, which is a economic guidance system, increased the quality of air and water, reduced the amount of wastes and promoted the development of environment-friendly technology in Korea, developing nations also need to leave direct regulation method through control and administrative command and instead introduce and operate the environmental charging system, which is a economic guidance system.

The problems that emerged in the operation of the environmental charging system in Korea can be important matters of consideration applicable to developing nations. These important matters are as follows:

First, regarding the environmental improvement charge, the person in charge of the environmental improvement charge in each local governing body is doing other works at the same time and the budget for the imposition and collection is not enough, as only 9% of the distribution money for collection is used for collection cost. The environmental improvement charge is mostly imposed on cars and there are many civil petitions as the environmental improvement charge is imposed on newly developed cars even though they are low pollution cars. The total collection rate is low as the unpaid charges are accumulated. In case of delayed payment, initial 5% of weight is applied and no additional weight is applied and it is considered to be a factor to enhance the rate of delayed payment. 81.4% of the payment delay is classified as simple avoidance. The average unpaid amount is 50,000

won per case and no additional weight is imposed. Therefore, most payments are made in the course of property right transfer, termination of registration and so forth.

Second, in case of air and water emission charging system, the collection rate of emission charges is low because of bad management and bankruptcy due to administrative lawsuit, small scale emitters, long-term economic crisis and so forth. Major reasons for payment delay include business closure and bankruptcy (757 cases, 16.3 billon won), administrative lawsuit (25 cases, 7.6 billion won) and bad management (433 cases, 6.5 billion won) and the amount that is difficult to collect is 30.4 billion won marking 80% of the entire uncollected amount. Most of the uncollected money is caused by businesses that discharge heavy metals. The water quality excess charge imposed on 8 heavy metal emission businesses is 19.2 billion won marking 51.3% of the uncollected excess charges (37,538,000,000 won). On the other hand, uncollected money is being accumulated as institutions avoid losses due to nonpayment in order not to take the accounting responsibility for the losses due to the unpaid emission charges. There is not enough manpower because workforce is not distributed according to the number of air and water quality emission charge object businesses. In case of air emission charge, basic charge is the most common and the charged amount is not very big. The reason is that actual imposition of excess emission charge is not conducted well due to the lack of manpower, measuring technology and device. Water quality emission charge is mostly excess charge and payment delays occur due to inability to pay the large amount of fine, administrative lawsuit and so forth. Collection is difficult as most businesses subject for the fine are small and there are many imposition cases.

Third, in the water quality improvement charging system, the emission amount is measured by Tele-Metering System and self measuring system (by using record log). In case of small businesses that conduct self measuring, government employees have to go to the site and check whether the number matches the value on the record book. Therefore, there can be differences in measuring. Regarding the air emission charge, the amount of pollutant is measured by dust collector and it must be measured on the site. In addition, the air emission charge object businesses are small and thus away from administrative power and problems can occur in the course of measuring. When applying the same system to developing nations, such problems must be considered.

Fourth, regarding EPR system, the recycling responsibility rate needs to be adjusted flexibly to fit the economic level of each nation. In reality, however, it is difficult to lower the recycling responsibility rate. If the recycling responsibility rate is lowered, the purpose of the system can be compromised. In addition, recycling businesses are becoming larger and recycling is possible with low cost in Korea but it is difficult for small businesses to approach the market.

Fifth, people might be passive about the introducing the environmental charge due to the increase of corporations' production cost and the increase of consumer price. Therefore, it is important to form a bond of sympathy and listen to various opinions among people. That is because resistances can appear from political groups while introducing the system. In

Korea, there was an attempt to introduce the environmental improvement charging system on gasoline but it failed due to resistance. In the same way, charging on heavy equipment was also abolished due to civil petitions. In the production area, no charge was given at the time of introduction. In the consumption area, many exemptions are made. In case of production, for example, the environmental improvement charges imposed on dump truck, construction machine, construction equipment and so forth were excluded.

Sixth, the discussion between government departments is also important. In developing nations, it might be difficult to introduce the system due to different opinions between government departments. In Korea, there was a plan to impose charges on energy at the time of introducing the environmental improvement charge but charges were imposed only on vehicles due to the related departments' opinion that it might cause confusions in the order of distribution. In other words, it was introduced to be imposed on fuel but was finally imposed on vehicles because no agreement was made between government departments.

Seventh, legal support might be missing. It is possible to dump massive amount of pollutants secretly during rainy season or at night just like Korea's experience of the past. In case of developing nations, developing industrial complexes in the course of economic development can increase land price and small businesses might move to areas with cheap land prices causing more serious environmental problems. Therefore, policy design is necessary considering such expected side effects. In addition, technical, legal and administrative systems must be arranged when introducing the environmental charging system. As it was mentioned before, emission charge can be calculated and imposed when emission amount is measured accurately and therefore the building of infrastructure and related technology such as data transmission, process, storage and so forth is necessary.

As it was mentioned before, emission charge can be calculated and imposed when emission amount is measured accurately. Therefore the building of infrastructure and related technology such as data transmission, process, storage and so forth is necessary. One of the most representative examples is the Phenol contamination of Nakdong River in 1991. After this accident, a national bond of sympathy was created about the introduction of the environment charging system. In case of developing nations, however, people have poor awareness of environment and government also tends to take policies that prioritize economic development instead of dealing with environmental problems aggressively. Along with the introduction of the environmental improvement charging system, therefore, policies are needed to enhance people's awareness of the environment.

2. Method to Apply to Developing Nations

In case of developing nations, environmental problems are serious because of air pollution and water contaminations are very frequent. Just like Korea, therefore, it is necessary to introduce and operate the emission charges for the total amount of the air and water pollutants based on the principle of charging on polluters. In addition, most wastes are

buried and the recycling rate is very low and it is necessary to enhance the waste recycling rate by introducing the extended producer responsibility (EPR) system. Now, these are some effective operation methods when introducing the environmental charging system applicable to developing nations.

First, it is necessary to impose charges with rates appropriate to the situation of developing nations and encourage corporations' autonomous pollution control and the innovation of technologies to reduce environmental pollutions. When introducing air and water quality improvement charging system, gradual increase of charging rate can be considered. In addition, the method to provide incentives to the corporations that promote environment-friendly technological development through the tax revenue from the environmental improvement charging system can be considered. Wisdom is required to receive people's opinions and reflect them on policies while gradually expanding imposition objects and selecting reduction objects. As developing nations have many poor corporations, it must be executed gradually in the beginning by states that are appropriate to the situation of each nation. If there are many exemptions such as military facility, public facility and so forth, policies might not be effective. Therefore, it is necessary to have exceptions but reduce them gradually. More than anything else, the government's commitment to minimize the load on economic subjects and reduce and remove the economic side effects by monitoring them continually is important.

Second, tax revenue is created when environmental charging system is introduced and operated and the financial resource needs to be used by deciding priorities. In the case of developing nations, there must be not many environmental base facilities (air and water process facility, landfill, incineration plant and so forth) and thus new constructions can be considered. Emission charging system can be introduced in the area of manufacturing industry in developing nations and financial resources can be used to reduce air and water pollutants and support the corporations' investment in prevention facilities. Collected emission charges can be used as the financial source of the environmental pollution prevention fund for long-term and low interest loan for corporations' investment in prevention facilities or they can be used for financial investment in the environmental base facilities such as air, water quality and so forth. In case of environmental improvement charging system, more various charging objects can be considered when applied to developing nations so that the financial resource for environmental investment can be prepared. The imposed environmental improvement charges can be used for supporting sewer system arrangement cost, sewage process plant, livestock waste process plant, high quality water process facility construction cost, environmental base facility operation cost and so forth. In addition, the financial resource can be used to support environmental pollution prevention project cost, environmental science and technology development cost, environmental policy research and development cost and so forth. In case of introducing and operating EPR system, the financial resource can be used for waste recycling facilities, waste recollection process facilities and so forth and investment fund needs to be used for raising the recycling industry.

Third, in order to respond to the problem of climate change, which is an international issue, the introduction of carbon tax and emission right trade system is being discussed in developing nations along with the operation of environmental charging system. Therefore, the policy of carbon tax and emission right trade system that will be introduced in the future must be discussed. However, carbon tax and emission right trade system are for carbon dioxide, which is green house gas, water quality emission charge is imposed for 3 water pollutants (BOD, COD, SS) and air emission charge is imposed for 2 air pollutants (sulfur oxide, dust). Therefore, separate operation is possible. In case of the environmental improvement charging system, if the tax rate is the same for gasoline and diesel, double taxing is possible for diesel vehicles. If the tax rate is not the same for gasoline and diesel, the environmental improvement charging system is possible as diesel emit more pollutants. Policies need to be adjusted to fit the situation of developing nations. In case of developing nations, urban pollution is serious due to diesel vehicles just like Korea in 1990s, a certain amount can be imposed on the owner of diesel vehicle annually or a certain amount can be imposed on fuel. In this case, the best way is to impose a certain amount on fuel but the next best way is to impose on cars (according to cc). It needs to be applied according to the situation of each nation.

Fourth, Korea is experiencing difficulties in imposing environmental improvement charges at the moment because of too many impositions compared to the small imposition cost and lack of effective management concerning delayed payment. In other words, a large amount of administrative manpower and money is required because there are many impositions. In addition, in the course of collecting the charges, impositions are made not on actual usage but on standard usage distorting the system. When applying environmental improvement charges to developing nations, long-term installment payment, recalculation of rate and so forth must be considered based on our past experience so that distortions will not occur in the operational process. In addition, confusion of the system can be reduced by making the imposition subject clear. For example, local governing body or central government can take charge.

Fifth, if developing nations introduce EPR just like Korea, they can enhance recycling rate and contribute to the development of recycle industry at the same time. For the EPR system, as developing nations do not have enough separate emission infrastructure and manpower, it will be difficult to conduct separate emissions directly. Therefore, it is desirable to conduct full EPR system after constructing recollection infrastructure and system for recycling items. The recycling responsibility rate needs to be adjusted flexibly to fit the economic level of each nation. In reality, however, it is difficult to lower the recycling responsibility rate. In developing nations, it is proper to set low recycling responsible rate and increase the rate gradually when introducing RPR system. The most important thing is that the system can be established and operated successfully when recollection system is well established and prepared. In other words, recycling is possible when recollection of

recycling items is conducted smoothly. In the civilian sector, in the aspect of autonomous participation, EPR system can be applied in developing nations if there are good recollection and process infrastructures.

It is proper to introduce the environmental improvement charging system gradually to fit the situation of developing nations. As it is mentions above, however, various obstacles can emerge when a country's system is applied to another country. It is necessary to minimize the economic side effects and reflect people's opinions on policies while pursuing the economic development that is in harmony with the environment. Various limitations follow until a nation's system is properly introduced and established successfully, the will of the authority is important more than anything else. In conclusion, it is proper to introduce and operate the environmental charging system to fit the situation of developing nations and to introduce and operate water quality and air quality improvement charging system and EPR system gradually in stages.

2011 Modularization of Korea's Development Experience
The Operation of the Environmental Charging System in Korea

Chapter 5

Conclusion

Conclusion

Compared to advanced nations where industry is well developed, developing nations have more serious environmental contamination. Even though developing nations have more serious living environment contamination compared to advanced nations, they have weak administrative base to execute environmental policies. Developing nations usually possess abundant natural environments, but air and water quality is deteriorating and the generation of wastes is increasing in the process of economic development; thus many developing countries face serious environmental pollutions. Due to the poor condition to execute policies to deal with such environmental problems, people's unawareness of environmental problems and the policies to prioritize economic development rather than environment, it is difficult to execute environmental policies.

In Korea, problem of environmental pollution was serious in the process of economic development. Much financial investment was needed to solve the problem of environmental pollutions such as air pollution, water pollution, waste and so forth; however, related financial source was not enough. Therefore, various environmental charging systems were introduced based on the principle of charging on polluters and benefiters being conducted in advanced nations and necessary financial sources were prepared to improve the environment and invest in the basic environmental facilities. It is evaluated to be very successful systems.

In Korea, for various environmental mediums such as air, water, waste and so forth, 23 environmental charging systems are introduced and operated. The purpose of emission charging system is to improve the quality of air and water, and charges are imposed on air and water pollutants. It is operated by the principle of charging on polluters. In the environment improvement charging system, charges are also imposed for air and water pollutants. However, the purpose of the policy is to reduce the amount of air and water pollutants generated by diesel vehicles and facilities. In the Extended Producer Responsibility (EPR), recycle charges are imposed for wastes and it is introduced to encourage the recycling of wastes by producers.

As a result of evaluating Korea's major environmental charging systems in the categories of originality of the system, effect of environmental improvement, function of financial supply and the success of system operation and evaluating the possibility of applying to developing nations, emission charging system (air, water quality), environmental improvement charging system and Extended Producer Responsibility (EPR) were evaluated as environmental charging systems that can be applied to developing nations in the future.

First, it is necessary to impose charges with rates appropriate to the situation of developing nations and encourage corporations' autonomous pollution control and the innovation of technologies to reduce environmental pollutions. When introducing air and water quality improvement charging system, gradual increase of charging rate can be considered. In addition, the method to provide incentives to the corporations that promote environment-friendly technological development through the tax revenue from the environmental improvement charging system can be considered. Wisdom is required to receive people's opinions and reflect them on policies while gradually expanding imposition objects and selecting reduction objects. As developing nations have many poor corporations, it must be executed gradually in the beginning by states that are appropriate to the situation of each nation.

Second, tax revenue is created when environmental charging system is introduced and operated and the financial resource needs to be used according to priorities. In the case of developing nations, there must be not many environmental base facilities (air and water process facility, landfill, incineration plant and so forth) and thus new constructions can be considered. Emission charging system can be introduced in the area of manufacturing industry in developing nations and financial resources can be used to reduce air and water pollutants and support the corporations' investment in prevention facilities. Collected emission charges can be used as the financial source of the environmental pollution prevention fund for long-term and low interest loan for corporations' investment in prevention facilities or they can be used for financial investment in the environmental base facilities such as air, water quality and so forth. In case of environmental improvement charging system, more various charging objects can be considered when applied to developing nations so that the financial resource for environmental investment can be prepared. The imposed environmental improvement charges can be used for supporting sewer system arrangement cost, sewage process plant, livestock waste process plant, high quality water process facility construction cost, environmental base facility operation cost and so forth. In addition, the financial resource can be used to support environmental pollution prevention project cost, environmental science and technology development cost, environmental policy research and development cost and so forth. In case of introducing and operating EPR system, the financial resource can be used for waste recycling facilities, waste recollection process facilities and so forth and investment fund needs to be used for raising the recycling industry.

Third, in order to respond to the problem of climate change, which is an international issue, the introduction of carbon tax and emission right trade system is being discussed in

developing nations along with the operation of environmental charging system. In case of developing nations, urban pollution is serious due to diesel vehicles just like Korea in 1990s, a certain amount can be imposed on the owner of diesel vehicle annually or a certain amount can be imposed on fuel. In this case, the best way is to impose a certain amount on fuel but the next best way is to impose on cars (according to cc). It needs to be applied according to the situation of each nation.

Fourth, Korea is experiencing difficulties in imposing environmental improvement charges at the moment because of too many impositions compared to the imposition cost, small imposition cost and lack of effective management concerning delayed payment. When applying environmental improvement charges to developing nations, long-term installment payment, recalculation of rate and so forth must be considered based on our past experience so that distortions will not occur in the operational process. In addition, confusion of the system can be reduced by making the imposition subject clear. For example, local governing body or central government can take charge.

Fifth, if developing nations introduce EPR just like Korea, they can enhance recycling rate and contribute to the development of recycle industry at the same time. For the EPR system, as developing nations do not have enough separate emission infrastructure and manpower, it will be difficult to conduct separate emission directly. In developing nations, it is proper to set low recycling responsible rate and increase the rate gradually when introducing RPR system. The most important thing is that the system can be established and operated successfully when recollection system is well established and prepared. In other words, recycling is possible when recollection of recycling items is conducted smoothly. In the civilian sector, in the aspect of autonomous participation, EPR system can be applied in developing nations if there are good recollection and process infrastructures.

It is proper to introduce the environmental improvement charging system gradually to fit the situation of developing nations. As it is mentions above, however, various obstacles can emerge when a country's system is applied to another country. It is necessary to minimize the economic side effects and reflect people's opinions on policies while pursuing the economic development that is in harmony with the environment. Various limitations follow until a nation's system is properly introduced and established successfully, the will of the authority is important more than anything else. In conclusion, it is proper to introduce and operate the environmental charging system to fit the situation of developing nations and to introduce and operate water quality and air quality improvement charging system and EPR system gradually in stages.

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Appendix: Summary of Interviews with Experts

Young Sung Yu

Gyeonggi Research Institute

Senior Research Fellow

1. Difficulties and Problems in the Operation of Environmental Charging System

▶ **Difficulties in imposing environmental charge (whether precise amount of pollutant emission can be measured and so forth)**

In the water quality improvement charging system, the emission amount is measured by Tele-Metering System and self measuring system (by using record log). Exemption is given to 5 poor manufacturing industries. About water quality emission amount, measuring is not difficult because business is not very big and TMS transmits data automatically. In case of small businesses that conduct self measuring, government employees have to go to the site and check whether the number matches the value on the record book. Therefore, there can be differences in measuring. Regarding the air emission charge, the amount of pollutant is measured with a dust collector and it must be measured on the site. In addition, the air emission charge object businesses are small and thus away from administrative power and problems can occur in the course of measuring. Government employees also have difficulties. Therefore, when implementing the system in developing nations, the related problems (lack of administrative power, laziness among government employees and difficulties in execution) must be considered.

▶ **What are the fundamental causes for low imposition and collection rate?**

If the low imposition rate is caused by the basic charges, it is proper to raise the rate gradually by reflecting the price increase rate. However, the pollutant emission inhibition effect through the adjustment of basic charging rate is small. As the basic charges are imposed to inhibit the amount of pollutants under a certain level, the guidance system to reduce the emission of pollutants is small. It is necessary to distinguish clearly whether the imposition rate for preventing contamination is low or whether the imposition rate for supplying financial resource is low.

For low collection rate, collection rate is actually high for facilities. Collection rate does not reach 100% because of bankruptcy, delayed payment, difficulty in management and so forth. However, things are improving. The collection rate for water emission charge and air emission charge is low, and the imposition amount for water emission has been accumulated. In addition, water emission charge and air

emission charge have different calculation methods. The amount for water emission charge is big and often causes bankruptcy, administrative lawsuit and so forth leading to low collection rate. When punishing past violations at once, government employees are being censured. Then they delay the deficits disposal to avoid responsibility and so forth causing low collection rate. When applying to developing nations, rewarding for deficits disposal for past violations, long-term installment for imposed amount, recalculation of rate and so forth can be considered based on Korea's experience. Regarding the collection rate for diesel vehicles, the collection rate of the environmental improvement charges is low due to aged vehicles, change of registration, destitution, errors in issuing the bill, change of workplace, resistance to paying and so forth.

▶ **Method to overcome the limit of not being used in a direct relation to the purpose of collecting the imposed amount**

It is currently included in special account and 9% of it is used for local allocation tax.

2. Concrete Example of Imposing Environmental Charge

▶ **Is there any case of collecting an excess imposition charge?**

Excess charge collection record is currently provided.

For type 1 and type 2, provincial offices are imposing the charge. For type 3 and type 4, cities and counties are imposing and type 5 is exempt.

3. Success and Failure of Environmental Charging System

▶ **Is there a small business that faced difficulties due to the imposition of environmental charge?**

As the imposition of environmental charge is becoming a problem due to the difficulty in the management, it seems that the cause and effect are reversed.

▶ **Was there any business that resisted the collection of environmental charge in the past? If there was, the government's will about it is important**

If payment is delayed, much administrative power is necessary and deficits disposal for the past violations is difficult.

▶ **Have you seen a positive case because of environmental charging system (ex: effect of environmental improvement, good response from local residents)?**

Environmental charge has low connectivity with local residents but high connectivity with businesses. The environmental improvement effect from environmental charging system is small. If financial resource is secured by the imposition of environmental charge and the financial resources are used for technological development and

investment in environmental improvement facilities, however, indirect environmental improvement effects can be expected. Of course, if the imposition of environmental charge reduces the amount of water and air pollutants, it is a direct effect.

4. Improvement for Environmental Charging System

▶ **Mediate with the policies to be induced such as carbon tax, emission right trade system and so forth**

For air emission charges, basic charges are imposed for 2 kinds (sulfur oxide, dust) and excess charges are imposed for 9 pollutants. For water emission charges, basic charges are imposed for 3 kinds (BOS, COD, SS) and excess charges are given to 19 kinds including the pollutants, to which basic emission charges are imposed. However, decisions are yet to be made about whether carbon is a pollutant (USA concluded that it is not). Therefore, carbon tax and emission right trade system are different from environmental charges in the area of imposition object. For diesel vehicles, however, double taxation can be a problem if the rate is the same for gasoline and diesel. If the rate is not same for gasoline and diesel, environmental charge can be imposed on diesel as it emits more pollutants.

Air and water emission charges are different from carbon tax. Same imposition or separate imposition is possible for diesel vehicles and it needs policy mediation.

5. Expected Matters when Applied to Developing Nations

▶ **Applying environmental charging system to developing nations**

Environmental charging system has little effect of environmental improvement. There is a minimum amount to be emitted. Therefore, operate excess charge in order to prevent excessive emission and allow a certain amount of emission. Emission of pollutants is quite large in developing nations. Therefore, it is necessary to reduce the amount of pollutants under a certain level through the operation of environmental charging system while conducting EPR later.

As developing nations have many poor corporations, it must be executed gradually in the beginning by states that are appropriate to the situation of each nation. If there are many exemptions such as military facility, public facility and so forth, policies might not be effective. Therefore, it is necessary to have exceptions but reduce them gradually.

▶ **When using the financial resources, where should they be used?**

For the use of financial resources, priorities must be set. Building of environmental base facilities (air and water process facility, landfill, incineration plant and so forth) can be considered.

▶ **Expected side effects when the policies of Korea are introduced to developing nations?**

Legal backup might be missing such as the lack of administrative power, laziness of government employees, loss of executive power and so forth. There is a possibility to resist to the policies. It is also possible to dump massive amount of pollutants secretly during rainy season or at night. In case of developing nations, developing industrial complexes in the course of economic development can increase land price and small businesses might move to areas with cheap land prices causing more serious environmental problems. Therefore, policy design is necessary, considering such expected side effects.

Myung Hyun Cho

Youngsan River Environmental Management Office

Environment Management Director

○ It is necessary to make up for the weak points in the introduction and actual operation of environmental the environmental charging system and the issues (intensions) in the process of introduction in the overview section so that developing nations can check.

○ It is better to prepare introduction story and describe the legal revision and expansion in the process of operation.

○ The report will become better if problems and efforts to solve the problems are described with reference.

○ If described based on legal revision and improvement, developing nations can check. Actually, such matters are operational experiences and thus can be applied to developing nations.

○ Of course, different conditions exist during introduction but Korea's experience can be one of the examples or references.

○ Detailed summary is possible when the system is presented in categories of imposition objects, reduction objects and so forth.

○ In Korea, there was an attempt to introduce the environmental improvement charging system on gasoline but it failed due to resistance. In the same way, charging on heavy equipment was also abolished due to civil petitions.

○ In the production area, no charge was given at the time of introduction. In the consumption area, many exemptions are made. In case of production, for example, the environmental improvement charges imposed on dump truck, construction machine, construction equipment and so forth were excluded.

- ○ Discussion between government departments is also important. In developing nations, it might be difficult to introduce the system due to different opinions between government departments. The original plan to impose on energy was changed to impose on vehicles due to the reason of causing confusion in the distribution order. In other words, it was introduced to be imposed on fuel but was finally imposed on vehicles because no agreement was made between government departments.
- ○ If such experiences are introduced in the legislation process, it will be helpful for developing nations.
- ○ On the other hand, Korea is currently experiencing difficulties in imposing environment charges because a large amount of administrative manpower and money is required as there are many impositions. In addition, charges are imposed not on actual use amount but on standard use amount creating the problem of distorting the system. If such content is included, it will be helpful for developing nations to operate environmental charging system.
- ○ Measuring instruments can be attached, but it creates the problem of excessive cost in case of small businesses.
- ○ If the imposition objects and presented, clear communication will be possible. For example, local governing body or central government can take charge.
- ○ There are many opinions that environmental charge overlaps transportation energy tax in Korea, and further discussion is necessary in the aspect of securing alternative resources. Alternative sources need to be secured in order to supplement the transportation energy tax.
- ○ On the other hand, special account has data only upto 2011 and update is necessary.
- ○ Korea's experience in the shortage of connection to the imposition of causers while using the financial resource of special account can be referred by developing nations.
- ○ There are many cases of imposition in Korea, and it is difficult for government employees to handle all cases. Therefore, computation was conducted, and Seoul Bank is in charge of computation in relation to the payment of environment charge.
- ○ In Korea, market based environment charging system was established after 1990s and environment improvement charging system was newly established because of the phenol incident. Therefore, forming of social atmosphere is important.
- ○ The report just introduces the current situation and system, but the background information and operation by stage can be meaningful information for developing nations. In other words, the report will become better if problems, legislations to solve the problems, department in charge and the process of solving the problems are recorded.
- ○ Through the report, it is necessary to consider the information and meaning that can be provided to developing nations.

Moon Suk Chang

Korea Environment Corporation, EPR Operation Team Section Chief

○ Shipping record has become different from legal content and therefore data need to be updated by referring to the homepage (www.epr.or.kr). Data is generally old and therefore update is necessary.

○ At the initial implementation of the system, promotion was not enough and people did not have enough awareness and did not support the system actively. Waste deposit system was already in place in Korea, however, it was helpful for the system to be established successfully later.

○ One of the examples for successful operation of the system is that film (vinyl) is collected separately by local governing body and fluorescent lights and batteries are collected separately by the local governing body. Such cases of success can be applied to developing nations.

○ A problem is that there are not many facilities to collect, fluorescent lights and batteries separately. Too much manpower and time are needed for producers to handle through contract.

○ The object items for separate collection have been expanded. It has been conducted for eight years, and the achievement in the seventh year is currently being evaluated.

○ Electronic products were originally EPR object items but are now managed as environment guarantee products.

○ The biggest reason why Korea could execute EPR successfully is because the waste deposit system was already in place. While incentive for separate discharging is low and participation of producers and business owners are not very high in waste deposit system, EPR has the advantage of having high incentive for separate discharging and being able to expect voluntary participation.

○ EPR can consider three methods in the operation of the system.

▶ Method of direct separate discharging

▶ Method through friendly society (currently 10 items are being discharged separately through friendly society)

▶ Method to have direct contract with recycling business

○ If developing nations do have enough separate emission infrastructure and manpower, direct separate discharging can be considered but it will be difficult due to circumstances. EPR must be selected and operated according to the condition in developing nations (On the other hand, a problem occurred as unapproved friendly society conducted recycling).

- ○ Therefore, EPR must be conduced after having such infrastructure and system condition.
- ○ Korea announces 5 year long-term recycling goal. First, responsibility rate for each item is announced by reflecting the record, responsibility rate and achievement rate of the previous year. Considering the economic situation, however, responsible producer, Ministry of Environment and friendly society get together and adjust the responsibility rate.
- ○ The responsibility rate needs to be adjusted flexibly to fit the economic situation. In reality, however, it is difficult to lower the responsibility rate. In developing nations, it is proper to set low recycling responsible rate and increase the rate gradually.
- ○ The most important thing is that the system can be established and operated successfully when recollection system is well established and prepared. That is because recycling is possible when recollection of recycling items is conducted smoothly.
- ○ Support money is received not by company but by recycling business. In the civilian sector, in the aspect of autonomous participation, EPR system can be applied in developing nations if there are good recollection and process infrastructures.
- ○ Korea's EPR imposition is about 5 billion won.
- ○ Support for recycling business might be needed when applying EPR in developing nations. In addition, recycling businesses are becoming larger and recycling is possible at low cost in Korea but it is difficult for small businesses to approach the market.
- ○ Major civil petition about EPR is to reduce rate when economy is not good. However, adjusting the rate flexibly is not easy.
- ○ Currently, import business owners are included in recycling responsible objects and objects for exemption have the responsibility to submit related documents.

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Ministry of Strategy and Finance, Republic of Korea

427-725, Republic of Korea Goverment Complex 2, Gwacheon, Korea Tel. 82-2-2150-7732 www.mosf.go.kr

KDI School of Public Policy and Management

130-868, 87 Hoegiro Dongdaemun Gu, Seoul, Korea Tel. 82-2-3299-1114 www.kdischool.ac.kr

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ISBN 978-89-93695-80-9

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