

# Environmental Economic Inducement Policies Affecting the Impacts of Environmental Management for Enterprises

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**요약** 20세기 말까지만 해도 경제발전은 자원고갈과 자연환경파괴를 통한 대량생산 및 대량소비를 전제로 하여 이루어졌다고 평가할 수 있다. 그 결과 세계의 자연환경은 급속히 훼손되었으며, 환경오염은 이제 인류의 생존을 위협하는 단계에 이르렀다. 이 같은 위기상황에 대처하기 위하여 지난 1980년대부터 선진국을 중심으로 환경경영에 대한 인식이 확산되기 시작하였다. 무엇보다도 자연환경의 보존을 요구하는 사회적 압력은 기업으로 하여금 환경경영의 필요성을 깨닫게 하였다.

환경경영이란 환경보전을 요구하는 이해 관계자들로부터의 요구에 기업이 이에 적극적으로 대응함으로써 환경보호와 경영성과를 동시에 달성하는 종합적인 경영을 의미한다. 환경경영은 기업의 전 활동에 걸친 전사적인 전략적 차원의 활동으로 기업경영이 어느 한 기능분야에 국한된 개념이 아니다. 궁극적으로 환경보호와 성장의 조화라는 기업의 목표달성을 위해 기업의 생산, 재무, 인사조직, 마케팅, 회계정보 시스템등의 활동이 모두 통합되어야 할 것이다. 본 논문에서는 기업의 환경경영에 영향을 미치는 주요한 정책들과 방안들, 환경경영의 인센티브제도를 비롯하여 환경경영의 제도와 기업사례에 대하여 고찰하였다. 특히 최근 들어 환경경영이 기업의 가치에 미치는 영향에 대한 구체적 연구들에 대해서도 검토하고자 하였다.

**Key Words :** Environmental Management, Economic inducement Policy, Economic Incentive, Green Production & consumption

## 1. Introduction

Polluters Pays Principle was initiated by the OECD countries in the early 70's in order to introduce rigorous environmental regulations. This principle is a non-compliance charge system in which polluters have to pay for the environmental damage they created. In its "Guiding Principles on the International Economic aspects of Environmental Policies; the principle is defined to promote practical use of scarce environmental investment, and to share the cost for the protection of the environment and its management". Environmental deteriorations and their serious problems have arisen from the process of growth-oriented development that so often exceeds the self-purification and reproduction capabilities of natural environment. Additionally, the phenomenon of market failure accounts for the aggravation of environmental problems. This failure is largely grounded in the insufficient reflection of environmental resources like water and air as cur-

rency value in the decision-making process of an economic entity.

Korea has had one of the fastest growing economies in the world since the 1960s, but the focus on economic development has been at the expense of the environment. Every part of the environment has suffered with increased air, water, and noise pollution, increased waste management problems, and reduced quality of life. The other major trend in Korea has been the rapid urbanization of the population. Total population reached 48 million in 2003. The six largest cities account for over half the population. The automobile population has also increased to 13 million.

Advances in technology have resulted in increased environmental impacts. The use of heavy equipment and engineering techniques has enabled cities to expand into flood-plains, coastal areas, and wetlands, sometimes with dire consequences. Korea began to step back from the course of rapid economic development with minimal regard for the environment in the 1980s. Legislation regulating emissions and water quality was introduced. The Ministry of Environment was established in November 1994. In the 1990s, there was an increase in citizen

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group environmental activities and the establishment of environmental groups such as the Korean Federation for Environmental Movement, Green Korea, Korea Sustainable Development Network, and the Citizens Coalition for Economic Justice.

As we moved into the 21th century, the pressure for environmental preservation and quality is becoming more and more important in Korea. This importance is being reflected in government policy, the activates of environmental groups, and a new attitude toward the environment by business. In this study we review the background environmental economic inducement policies and analyzes the impacts of environmental management for business enterprises.

## 2. Environmental Economic Inducement Policies

The Government of Korea has been making extensive efforts to address complex environmental problems that arose simultaneously with the rapid compressed growth of the last three decades . The environmental administration of MOE evolved from sanitary management to pollution prevention to environmental management and to precautionary approach and economic incentive.

MOE has been introducing diverse economic incentive programs since 1990. These programs are designed to provide economic incentives for pollution reduction through market mechanisms, while inducing enterprises and households unconsciously make environment-friendly decisions. Some of the major economics incentive programs include charge, subsidy, deposit-refund, enforcement incentives, and tradable emissions permit system. (MOE, 2003)

### 2.1 Environmental Improvement Charges

The Environmental Improvement Charge System was established based upon the Polluter-Pays Principle, which holds that those who discharge pollutants are responsible for environmental improvement expenses. The charges levied on polluters vary directly in proportion to the volume of pollutants discharged. The purpose of this system is to help reduce pollution and raise financial resources for

environmental investment. The Environmental Improvement Charge System Act was enacted in December 1991, thereby creating a legal basis for the government's efforts.

Environmental improvement charges are imposed on the owners of large buildings or diesel-powered vehicles, as they discharge relatively larger quantities of pollutants. The structures subject to these charges include buildings with a floor space in excess of 160m<sup>2</sup>, except those located in agricultural areas in accordance with the Land Use and Management Act. Owners of diesel-powered vehicles, who are registered nationwide in accordance with the Automobile Management Act, are required to pay these charges as well.

Production and manufacturing facilities, and diesel-powered motor vehicles equipped with three-way catalytic converters, however, are not included. Facilities and motor vehicles owned by foreign governments and residential housing units, including apartment complexes, are also excluded.

Those who actually own facilities or motor vehicles as of the date of imposition are subject to charges. When the owners of these facilities cannot be identified, those who use the facilities at the time of imposition are then subject to these charges.

In 1993, the first year the system was in operation, when the imposition of charges was limited to facility owners, a total of 38.6 billion won(or 32million US\$) was collected. In 1995, when owners of diesel vehicles were also subject to the charges, a total of 113.2 billion won(or 94million US\$) were collected. In 2003 a total of 567.3 billion won(or 473million US\$) were collected<sup>1)</sup>.

### 2.2. Emission Charge System

This system was put into effect on September 1, 1983 in order to prevent damage to the environment from pollutants discharged in excess of the established permissible limits and to ensure that companies actually observed them. Any firm found to violate the limit was required to pay emission charges in an amount equivalent to the treatment expenses for

1) Statistics from annual budget of Ministry of Environment, 2004

the excess volume of pollutants emitted.

Emission charges are imposed on business establishments discharging 10 specific air pollutants, including sulfur dioxide, 17 specific types of water pollution, including BOD and COD, and two specific types of livestock wastewater pollution, including BOD and suspended solids. Offensive odors are also considered pollution under the law. In 2003, there were 7,878 charges for emissions which were billed for a total of 16.4 billion won(or 13.6 million US\$)<sup>2)</sup>

### 2.3 Volume based collection fee system

The objectives of the Volume-based Collection Fee System<sup>3)</sup> (National Report on EDP in Korea, 2001) for Municipal Wastes are to minimize the generation of waste and encourage households to separate their wastes for recycling. The system was put into effect nationwide on January 1, 1995. Until that time, waste collection fees have been calculated for each residence based on the level of property taxes imposed on houses or apartments, or the size of buildings regardless of the actual volume of wastes that residents generated. The volume-based collection fee system strongly adheres to the "Polluter-Pays Principle".

Household waste should be discarded in the officially designated plastic trash bags, which are manufactured and sold by city, county, and district governments. These regulations, however, do not apply to the discharge of burned coal briquettes and recyclable wastes including paper, waste iron, metallic cans, bottles, and plastics. These are collected at no charge if discarded properly at designated locations as determined by the local governments.

Local governments also have the discretion to set the collection fees for discarded furniture and major home appliances. Wastes collected during street cleaning and park cleaning may be discarded in

trash bags for public purposes provided free of charge. The prices of official trash bags are determined by ordinance of the local municipal and county governments after consideration of waste treatment costs and the financial state of the local government in question.

In looking at the past 9 years of the system's implementation, it was determined that the system has yielded reduced waste by 41% and helped generate a 74% increase in retrieval of recyclable items, resulting in an overall economic benefit of about 2,860 billion won.

### 2.4 Promotion of Environment-friendly Management and Green Production & Consumption Patterns(MOE, 2003)

#### 2.4.1 Fostering Environment-Friendly Management

Building upon the cooperation and partnership between our Government and enterprises, Korea introduced the Environment-Friendly Company Designation System(as of 2002, 134 companies have been designated) and Voluntary Environmental Agreement System(as of 2002, 355 agreements have been signed) in 1995 and 1999, respectively, in order to promote companies to make voluntary environmental efforts.

We have also developed and distributed an array of advanced environmental schemes, including 'Corporate Environmental Report', 'Environmental Cost Accounting', and 'Environmental Achievement Assessment Index.' by evaluating the environmental performance of enterprise and disclosing its environmental information, such schemes strive to propel enterprises to take on their social and environmental responsibilities. At the same time, these schemes help enhance their environmental management capabilities.

#### 2.4.2 Developing Sustainable Production & Consumption Mechanisms

In order to expedite the establishment of a sustainable production system in Korea, we operate environmental labeling systems like 'Environmental Mark System' (1992) and 'Environmental Performance Record Certification System' (2001). We also assist in drafting and distributing the directive on the

2) Statistics from annual budget of Ministry of Environment, 2004.

3) Volume Based Collection Fee (VCF) System is to pay the waste treatment fee according to the volume discharged. All the wastes should be disposed into the designated plastic bags that are usable only in each city or county. The waste collection fee is included in the price of the bags that is different on the districts.

Design for the Environment to ensure that enterprises consider environmental performance of products from early stages. We similarly support the Eco Supply Chain Management Project to facilitate the supply of environment-friendly raw and subsidiary materials.

Meanwhile, to promote the purchase and consumption of green products(recycled goods), which are weaker in terms of marketability compared to their conventional counterparts, our Government is working to legislate the 'Green Purchase Act'. We also sponsor events to promote the purchase of environmental goods, recommend public organizations to buy environmentally certified products, and execute the 'Green Building(Environmentally Friendly Structure) Certification System'.

### 2.5 Compressed Natural Gas (CNG) Buses

As the number of registered motorized vehicles in Korea reached 12 million, Seoul and other large cities with high concentrations of car ownership became the main culprits of urban air pollution.

In particular, gasoline-powered vehicles which lack advanced emission reduction technology are more responsible for air pollution than other types of vehicles are, accounting for 52% of the total vehicular emission. However, large diesel-powered vehicles like buses and trucks, which only represent 4% of all registered vehicles, generate more than 40% of the total vehicular pollution. This realization called for an immediate response.

The government is therefore facilitating the placement of diesel intracity bus fleets with compressed natural gas(CNG) buses)<sup>4)</sup> with the expectation that urban air quality can be improved in a short term.

The domestic development of CNG buses began in 1991 and ended in 1997with the joint effort of industry, academia, and research institutes. Four CNG buses have been operating on a trial basis in Incheon and Ansan since July 1998 and have received positive responses from the passengers.

4) As opposed to diesel buses, natural gas buses do not produce any smoke, result in 70% reduction in ozone (O<sub>3</sub>) and NO<sub>x</sub>, and register substantial decrease in noise.  
5) The White paper on environmental policy, Ministry of Environment , 2003.

To promote the replacement of diesel buses with the CNG versions, the government is providing financial support in the forms of bus purchase subsidies(2.25 million won per bus), financing of recharging equipment (700 million won per unit), tax cuts on value-added tax and acquisition tax, and an environment-friendly oil pricing system designed to favor CNG over the conventional alternatives. In addition, city planning codes and other regulations were adjusted to facilitate the building of needed infrastructure such as the CNG recharging stations<sup>5)</sup>.

### 2.6 Extended Producer Responsibility (EPR) System

Under the current mass production and consumption system, the government and consumers alone cannot assume the full responsibility for establishing a resources-recycling society through reducing and recycling wastes.

Extended Producer Responsibility(EPR)<sup>6)</sup> means that the producer bears a degree of responsibility for the products to the end of their useful life by imposing a mandatory recycling amount on the products and recycling dues on the unfulfilled amounts. The EPR system seeks to en-courage producers to conduct environment-friendly activities throughout the entire product life-cycle, from design and manufacture to distribution, consumption and disposal of products.

It establishes a resource-recycling economic and social system by promoting reduction, reuse, and recycling of wastes. Details of implementing the EPR system are divided into five categories as follows.

First, MOE establishes basic plans for recycling resources every five years, and sets the target recyclability rate, and mid- and long- term recycling objectives.

Second, in accordance with MOE's guidelines,

6) The underlying concept of EPR is that the producer who decides on materials and designs products should take the leading role. EPR is rapidly gaining ground in European, South American and some Asian countries. The system is not an entirely new concept to Korea, because the Deposit-Refund system based on the Producer Responsibility has been under way since 1992.

each local administration announces the actual quantity of recyclable re-sources by target item and the quantity of wastes to be sorted out and collected. MOE thereby takes recycling circumstances into account, calculates the mandatory recycling quantity by product and packaging materials every year, and announces the results after consultations with relevant ministries.

Third, each producer bound by the EPR system must submit their recycling plans for approval from MOE. Likewise, individual producers must determine whether they form a cooperative association to fulfill their obligations or individually practice recycling by commissioning the work to relevant businesses. Fourth, individual producers under the system perform their recycling obligations and submit reports on the results.

Lastly, MOE confirms and reviews their reports of recycling performance so as to ascertain whether or not their obligations have been appropriately fulfilled, and where inappropriate, imposes and collects corresponding charges on relevant producers.

EPR came into force on Jan. 1 of 2003. The film packaging materials and fluorescent lights are, however, due to be subject to EPR from 2004, the audio equipment and mobile phones, from 2005, because their conditions are not yet fully ready for recycling.

### 3. Impact of Environmental Management and Cases Studies

#### 3.1 Environmental Management System

Business Enterprises recently recognized the importance of environmental management by stakeholder's pressure demanding strongly for natural environment preservation. Environmental management is focusing on natural environment in the innovation of management operating method in order to create new comparative advantage among other enterprises. It is not only to participate environmental protection in terms of dimensions of principles and ethics but also to grasp the nature of environmental problems and then to cope with changes of stakeholders surrounded with enterprises such as consumers in terms of harmony between long term growth and environmental preservation as a strategic

management.

Environmental Management is synthesized management to accomplish both environmental preservation and economic success of business enterprises at the same time by responding positively and strategically in needs of stakeholders. Therefore, it is not limited departmental function of enterprises, but whole functions of all activities of the firms. Ultimately, in order to achieve the objectives of cooperations balancing environmental preservation with the growth all activities of the function, finance, personnel organization, accounting, MIS should be integrated(see Fig. 1). Fig. 1 shows stakeholders and internal function of business enterprises.

#### 3.2 Environmental Management of Yuhan-Kimberly (Green Korea 2003)

Yuhan-Kimberly, established in 1970, is a leading domestic company that produces and supplies articles of daily necessity such as toilet paper, tissues, diapers and sanitary napkins, as well as environmental protection products like oil absorbents and non-woven fabric.

##### 3.2.1 Environmental Management system

The Yuhan-Kimberly Environmental Management Structure is supported by four pillars "Quality Management", "High Performance Organization", "Vision Sharing Management" and "Environmental Management System." Success fully operating the

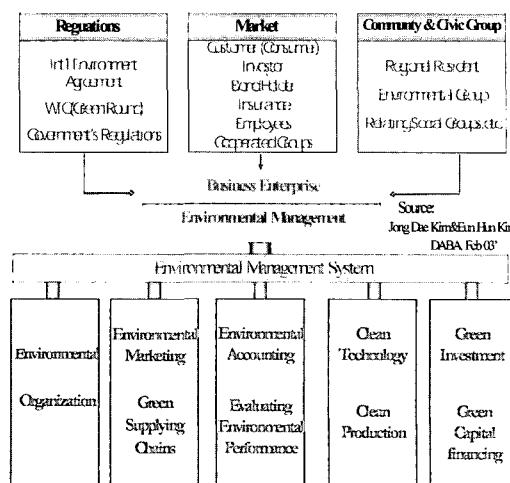


Fig. 1

Environmental Management Structure outlined below, the chief executive of Yuhan-Kimberly, who also serves as its chief environmental administrator, led all production plants to receive ISO 14001 certification and to become designed as an environmental friendly company.

### 3.2.2 Forest Cultivation Fund

Yuhan-Kimberly has been conducting a campaign on "Keeping Korea Clean and Green" since 1984 to plant trees nurture forests.

Until April 2003, Yuhan-Kimberly contributed a total of 4.43 billion won over 83 times to the Forrest Cultivation Fund and planted 20.09 million trees in approximately 81 million square meters in state-owned lands. It has also cultivated natural forests and carried out blight preservation projects.

### 3.2.3 Cultivation of Nature Friendly Educational Environment

Yuhan-Kimberly has been making efforts to grow forests in schools for a nature-friendly educational environment. In 1998, it began designating demonstration schools in conjunction with the civil organization called "Forrest of Life", providing consulting services for school forrest development, donating trees and assisting in the development of educational programs on forest. Presently, the Forest of Life has designated 189 demonstration schools nationwide, and it plans to continually expands the forest-growing project.

Starting in 1988, Yuhan-Kimberly has been running an annual "Green Camp" for high school students nationwide during summer breaks. So far, this Camp has produced 2,165 students from 380 schools over 20 sessions. Yuhan-Kimberly has been planting trees with newlywed couples since 1985 with the recognition that planting trees is tantamount to providing future generations with a better, more resourceful life. By 2002, 106 thousand saplings were planted in stated-owned lands by some 6,500 couples.

## 3.3 Environmental Technology of Samsung Engineering (Green Korea , 2003.)

Established in January 1970, Samsung Engineering has successfully undertaken over 2,000 plant-building projects as the first engineering company in

Korea. Notably, since late 1980's it has expanded fields of business beyond a traditional stronghold of petrochemicals, refining gas plants. It has developed leading industrial facilities, seeking to serve electronics, textile, and food productions as well as administrative and sports activities; and it also developed energy/railway sectors such as power generation, gas production facilities, pipeline railway/high-speed train base. The company further expanded its territory towards the environmental sectors such as sewerage/waste water treatment, raw/pure water treatment, air pollution control/waste disposal treatment. To that end, Samsung Engineering has become a driving force of the Korean industry underpinned by profound experiences.

### 3.3.1 Environmental Facilities

Samsung Engineering values the environment as a fundamental component for a balances human life; there by it aims to make every possible effort in environmental protection, as an in-house environmental specialist within the Samsung Group. In the water treatment area, Samsung Engineering successfully developed advanced treatment processes for industrial waste water(semiconductor, dying, paper, petrochemical etc.), raw/pure water, and nitrogen and phosphorus suitable for domestic sewage. The company is also actively participating in a privatization of the environmental sector as well, by undertaking Social Overhead Capital Operation and Maintenance(SOC O&M) projects jointly with advanced foreign players. In waste treatment and air pollution prevention facilities, Samsung Engineering retains a wide range of technologies such as Municipal Solid Waste(MSW) and industrial waste incineration, waste sludge incineration, landfill, dioxin, denitrification, desulfurization, and Volatile Organic Compound(VOC) etc. In collaboration, the company has become a comprehensive environmental solution provider, catering to any demands of clients through outstanding technological expertise and extensive experiences.

### 3.4 Other Cases and Researches.

Jong-Dae Kim & Lee Eun-Hum(2003) reviews the background of the advent of environmental management and the investigates the driving forces of envi-

Table 1. Significance analysis of CAR (related industry)

	(-3,+30)	(-3, 0)	(0,+4)	(0,+9)	(0,+19)	(0,+30)
CAR	-0.02526	-0.0289	-0.0141	-0.0787	-0.1262	-0.2191
T-value	-3.3512***	-1.0665	-1.9545**	-1.8393**	-2.0837**	-2.9064***

\*\*\*, \*\*, \* . Significant level at 1%, 5%, 10% respectively(one tailed test)

ronmental management and their relationship with financial performance of the enterprises.

The results based on survey of 163 Korea firms indicate that

1) higher differentiation orientation and cost advantage orientation of firms lead to higher level of environmental management

2) higher differentiation orientation and cost advantage orientation of firms result in better financial performance and

3) firms that exert more efforts in environmental management show better financial performance.

Han-Taek Sim& Hung-Il Jo(2004) examines abnormal returns around the day of the environmental pollution incident is announced using data of phenol accident for Doosan Electronic co. The Empirical evidence shows that a significant negative reaction occurred in abnormal returns of the group subsidiaries and the intra-industry firms.

The significant decrease of abnormal return is detected on the around newspaper reports days in Doosan group firms and related industry firms. this result suggests that investors interpreted such incident disclosures as a negative sign of firm subsidiaries and related industry firm's exposure to future regulatory costs. Although both groups of firms are affected negatively, there is evidence that the firms directly competing in the market with the incident firms were less affected that group subsidiaries.

#### 4. Conclusion

During the 1980s and 1990s, the Korean government gradually began to place a greater emphasis on environmental quality. This change in emphasis came about as a result of pressure from an expanding number of citizens groups and through a series of international environmental agreements the government signed.

The government realizes that there needs to be a

greater balance between economic development and environmental preservation. This move toward a more balanced view is reflected in the use of integrated environmental and economic accounting systems to determine future national development strategies.

There is a greater social consensus in Korea. This is shown by the increase in environmental activism by the general public. Environmental groups are growing in numbers and influence. Programs to reduce pollution receive support from the general population. People clearly want a cleaner and more livable environment.

Changes in the economy will also have an impact on the environment. In the past, Korea has focused on heavy industry as a basis for its development. The emphasis in the economy is now shifting toward high value industries and the information economy. This shift should result in less industrial pollution over the long run.

In order to ensure the environmental performance of production, consumption, and other various economic activities, environmental cost should come to play a critical role in the decision-making of both individuals and enterprises in their economic activities. For such internalization of environment cost, the following priority tasks should be carried out immediately.(MOE, 2003)

First, the government should develop a scientific basis and too; for calculating the environment cost. It should also establish a mechanism that can efficiently reflect the calculated environmental cost.

Second, we should promote environmental awareness of consumers and enterprises, while devising a sound system for the granting of diverse economic incentives. It is also important to catalyze the development of new environment-friendly technology.

Third as recommended by the UN, each country should devise the System of Integrated Environmental and Economic Accounting(SEEA) to analyze the

impact of the environmental sector on the national gross domestic product. There should also be a viable linkage between the environment and finance, accounting, and tax systems. Ultimately, a green market economic system in which the stock value of environment-friendly enterprises is higher than that of others should become firmly established, especially focusing on the maximizing of the value of the firm.

Fourth, countries should foster extensive information sharing on the knowhow of market approaches, for environmental improvement. At the same time we should seek to create synergy-effect by cultivating bilateral and regional network market approach systems.

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