

Considerations for the Integrated Environmental Management System in Korea

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Abstract. The integrated environmental management system has been implemented mostly in EU to prevent the environmental pollution materials generated by industries and to minimize their emitted amount. In order to address the problems in the existing management of environmental pollution materials under the multiple law system, Korea is preparing a local-type integrated environmental management system. This paper shows the direction of the Korean-type integrated environmental management system and its impact on the industries and suggest the responses from the industries.

Keywords: Integrated environmental management system, integrated pollution prevention and control (IPPC), best available techniques (BAT), cleaner production

1. Introduction

Korea enabled economic growth through fast industrialization. However, as a result, the burden on the environment is increasing every day. As of 2013, the number of waste water discharging facilities was 49,201. The amount of waste water generated by these businesses was around 5,269 tons per day, and 60% of it was being released to the rivers. The number of air pollutant emitting facilities was 48,035 as of 2012 in Korea. The amount of emitted air pollutant, including greenhouse gas, is increasing every year. [1] In order to decrease the amount of emission of these pollutants and to prevent environmental pollution, the government has operated the system to manage the pollutant separately based on its type. However, this separate management system has revealed problems, such as duplicate authorization and permission, lack of technological information, and insufficient review on permission cases. In order to address the loopholes in the existing system and to effectively prevent and manage pollution, the government is pushing forward with the establishment of the Korean-type integrated environment management system based on the benchmarking study of European integrated pollution prevention and control (IPPC). The basic principles of the Korean-type integrated environmental management system are to prevent the environmental pollution through technological innovation, industrial cooperation, and on-site adaptation. As in EU IPPC, the new system will apply the best available techniques (BAT). BAT guideline will be prepared for each industry and will be applied to the businesses. Many local businesses are expressing concerns for the cost generated by the application of BAT and the burden of technological development. This paper presents the trend in the existing environmental management system and the new integrated environmental management system, study the impact from the integrated environmental management system on the industry and suggest direction for pollution free production to the businesses.

2. Trend in the Integrated Environmental Management Policy of Korea

2.1. Status of the local environmental management system

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To promote economic growth, Korea developed the 1st 5-year economic development plan in 1962, and established the Pollution Prevention Act in November 1963 to respond to environmental pollution. The Pollution Prevention Act was revised even before 1971 to set the emission limit for air, water, noise, and stench and introduced the permission system to manage these sources of pollution. With the acceleration of the economic development centered on the heavy and chemical industry in the 1960's and 70's, the government enacted the Environmental Protection Act in 1977 in order to better respond to the changes. The Environmental Protection Act designated especially harmful materials, established the environmental standards, and introduced the contribution system for emitters, and it designated 55 pollution materials without the classification of their medium. However, since various environmental problems occurred, it was separated into multiple laws, including the Air Environment Protection Act, Water Environment Protection Act, Noise and Vibration Regulation Act in 1990, and such structure has been maintained since then. [2] Even though the local pollution sources were managed based on the multiple law system, various problems were revealed, and therefore, the need for the introduction of the integrated environmental management system was suggested. The summary of the problems of the existing system is as follows. First, since the authorization and permission system for each pollution medium is separately established, the duplicate authorization and permission are given frequently. Second problem occurs because most permission review procedure is based on formal document review. With the formal document review alone cannot monitor the business places and carry out the pollution management in an adequate manner. Third, since the management takes place after a situation occurs, the production procedure is not being improved, and the technology for pollution reduction is not being developed. In order to overcome these problems, the integrated environmental management system implemented by advanced nations like EU is being studied, and the introduction of the Korean-type integrated environmental management system is being considered.

2.2. EU's Integrated Environmental Management System

In 1996, EU established the Integrated Pollution Prevention and Control Directive (Directive 96/61/EC) to oblige the member countries to build the integrated environmental management system. In 2010, it officially adopted the Industrial Emission Directive (Directive 2010/75/EU in 2010 and further sophisticated the integrated environmental management laws. IPPC/IED is a legal system for the integrated management of each pollution source through minimizing the impact of the pollution materials on the overall environment. It aims to minimize environmental pollution through encouraging cleaner production of the businesses. For system implementation, IED proposes the principles, including integrated approach, best available techniques (BAT), flexibility, inspection, and public participation. If we are to apply these principles to a single business place, the business place should consider the overall impact to the environment, including the emission of pollutants to air, water, and soil, generation of waste, use of raw material, energy efficiency, noise, and accident prevention, in an integrated manner. In addition, by applying the BAT, it should prevent pollution and should make technological efforts to minimize emission. The BAT covers the comprehensive concepts, including the analysis of the relations between the materials and energy used and the emitted pollutants, management and design of factory, facility operation practice, preventative management, and monitoring obligation. While the BAT places more value on prevention of the generation of pollutants through encouraging cleaner production of businesses, it also covers post-treatment technology to control the emitted pollutants that have not been prevented. [3]–[6]

2.3. Direction of Korean environmental management system improvement

The direction of the Korean-type integrated environment management system can be summarized into five. First is to simplify the system through integrating the 9 authorization and permission system separately operated based on 6 laws. In other words, one business place has received up to 9 authorization and permission until now. However, this will be integrated into one authorization and permission. Second, the BAT standard document should be prepared by each industry and propose the basic principle to reduce the industrial environmental pollution and to boost the technological development for cleaner production. Third, customized emission standards should be established and applied, reflecting the peculiarity of business types and facility and the impact on local environments. Fourth, through reviewing the permission every 5 to 8 years, encourage the adequate level of environmental management. Fifth, avoid one-off detection of

violations and provide the foundation to enable the businesses to management in a voluntary manner. For instance, the focus of regular inspection should be shifted to technological one to support environmental improvement and production enhancement of businesses.

3. The impact of the Integrated Environment Management System on Industries and Clean Production

The effective implementation of environmental regulation may preserve the eco system and improve the environment through decreasing the emission of pollutants. Industrial activities have provided us with benefits. However, they are the main contributor to the worsening global pollution. The Korean government has managed the facilities that emitted pollutants through the existing multiple acts. However, it was reported that 25% of the facilities that emitted pollutants violated the regulation: 12% of them were discovered to have installed and operated the pollutant emitting facilities without permission: 9% operated the facilities in an abnormal manner, illegally releasing waste water: and 10% emitted the pollutant to public water, violating the legal emission limitation. In order to prevent such violations, the integrated environmental management system includes enhanced monitoring of pollutant emitting businesses based on expanded number of experts in the certifying institutions. While monitoring the status of pollution emitting business places, the technological inspection for the business will be carried out. The Korean-type integrated environmental management system ultimately aims to prevent environmental pollution and to reduce emission. However, it also aims to decrease the burden off the shoulders of the businesses and to encourage the technical innovation over the mid- and long-term. It has been proven through many studies that environmental regulations have provided a positive impetus for companies to innovate their technologies.

The Korean-type integrated environmental management system will be implemented in 20 industries in a gradual manner over the 5 years starting from 2017. The industrial opinion will be reflected as much as possible through ensuring the industrial participation in the preparation of the BAT standard document. However, it is expected that among the 1,359 companies that should receive permission, 491 of them are mid- and small-sized ones. There are SMEs that express concern about the burden to be placed on the SMEs that have weaker technological development capability and R&D foundation. However, even from their perspective, in order to improve productivity and generate business profit, they should thoroughly manage the life cycle of products and services in order to prevent environmental pollution and to minimize emission. [7], [8] The Ministry of Trade, Industry & Energy (MOTIE) has proposed the clean production guideline to decrease the burden of the companies and to ensure sustainable growth. In addition, it is supporting the development of clean production technologies, including the technology to respond to the global environmental regulation, green product production, clean production process, product and service commercialization and sustainable consumption. Table 1 represents the promising technologies of each sector. In order to minimize the burden of environmental pollution and help an eco-friendly industrial structure to establish itself, not only the response to regulations, but also the development of clean production technology that takes the lead in the industrial environmental regulation is required.

Table 1: Promising clean production technologies of Korea

Relevant Area	Promising Technologies
Response to global environmental regulation	Light material development technology, technology to reduce the harmful material inclusive in products
Green product production	Nature imitation product, products to utilize CO ₂ , development of high-end materials through utilizing waste
Clean production process	Improvement of efficiency of production system, zero-emission production process
Product and service commercialization	Product-ICT convergence, car sharing, resource circulation service business
Sustainable consumption and production	Establishment of the industrial eco system, eco design, appropriate technology, etc.

4. Conclusion

The environmental regulation in Korea was largely impacted by the regulatory trend in EU and advanced nations. We have experienced the changes in global industry and market caused by the environmental regulation of advanced nations when WEEE, ELV, RoHS, and REACH were implemented. These regulation had a significant impact on the establishment of local environmental regulation and industries. [9] Similarly, the integrated environmental management system is affecting the system to manage pollutants in Korea. The new integrated environmental management system of Korea will have a large impact on the industrial production process improvement, technological development, and system to manage pollution in all steps of production. Instead of responding to regulations in a belated manner, the local companies should continue their efforts for technological innovation and production process improvement in a pre-emptive manner to build global competitiveness. They should first develop understanding of the BAT to be applied under the integrated environmental management system and strategy for technological development.

5. References

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