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Review

# Two decades, three WEEE systems: How far did EPR evolve in Korea's resource circulation policy?

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ABSTRACT

Extended producer responsibility (EPR) has become a dominant policy paradigm for the management of waste electrical and electronic equipment (WEEE) in the last two decades. In South Korea the principle has guided the evolution of the resource circulation policy even before its official introduction through a revision of the recycling law in 2002. Elements of producer responsibilities could be found in the producer-based deposit refund system (DRS) a decade earlier and they were strengthened through the enactment of a new resource circulation law in 2008. This article reviews the policy changes in South Korea for the management of WEEE during the past 20 years. The focus of the analysis is on the impacts of EPR and the producers' responses that were expressed through the quantity and the quality of material flows in the society. The findings are discussed in light of international experiences in order to outline measures to improve the effectiveness of the EPR-based resource circulation policy that could have broader implications beyond the case study.



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## 1. Introduction

Extended producer responsibility (EPR) marked a fundamental change in end-of-life policy from that of waste management into resource circulation from a life cycle perspective. In its guidance manual for governments, the Organization for Economic Co-operation and Development (OECD, 2001) defines EPR as "an environmental policy approach in which a producer's responsibility, physical and/or financial, for a product is extended to the post-consumer stage of a product's life cycle." EPR can also be defined as a "policy principle" (Lindhqvist, 2000) that guides the selection of the policy mix or a "policy paradigm" (Manomaivibool, 2008) in the analysis of policy changes. These definitions share the notion that the concept envisions policy objectives that are based on a changing problem theory: The problem of solid waste is perceived as a problem of suboptimal design of product systems that failed to internalize environmental impacts in the post-consumer stage. Because the producers have influence over

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the design decisions, profound improvements can be achieved by extending their responsibilities to the end-of-life management.

In public policy EPR is mandated by legislation. Producers are asked to take back and/or cover the cost of environmentally sound reutilization of used products. Although voluntary agreements exist, they are often pre-emptive actions in anticipation of legislation and can benefit from a legislative backing to level the playing field between participating companies and free riders (Khetriwal et al., 2009; Tojo, 2004; Park, 2002). In a mandatory program, EPR does not mean each individual producer has to take all the responsibilities in the end-of-life management of its own products. The targeted industries are allowed, if not obliged, to set up a collective body such as a producer responsibility organization (PRO) or a clearinghouse to coordinate their efforts and facilitate compliance. Actual downstream work can be outsourced to waste management companies and authorized treatment facilities. Besides producers, local governments and distributors normally play a crucial role in product take back in order to capitalize on the existence of the waste collection and the product delivery systems.

The practical development of EPR can be traced back to the enactment of the German *Ordinance on the Avoidance of Packaging Waste* in 1991. The success of the Ordinance that saw the consumption of packaging decoupled from the economic growth in Germany (OECD, 1998) encouraged policy diffusion. Several countries in Europe and East Asia had developed recycling programs not only for packaging waste but also for major home appliances in the 1990s. But, it was the promulgation of the *Directive 2002/95/EC on the restriction of the use of certain hazardous substances in electrical and electronic equipment* (RoHS Directive) and the *Directive 2002/96/EC on waste electrical and electronic equipment* (WEEE Directive) that sparked an international interest in the management of waste electrical and electronic equipment (WEEE) in the 2000s (decade).

Although no national law exists in North America, states, provinces and cities have implemented various measures to divert display and computing devices from landfill and promote their reuse and recycling including impose convenience standards, high collection targets, quality rewards and/or underachievement fines. The collection targets based on previous sale volumes are also adopted in the recast of the WEEE Directive. Instead of the four kg per capita target, the new Directive 2012/19/EU requires the member states to achieve the collection rate of 45% by weight of EEE put on the market in the three preceding years by 2016[1]. While developing countries have recently joined the policy bandwagon, some prefer a direct state intervention based on an interpretation of EPR to the target-based system (Manomaivibool, 2011). A governmental fund sponsored by the fees paid by the producers was erected in China to subsidize the management of major WEEE items; and, a similar proposal was pending in Argentina and Thailand.

The evolution of resource circulation policy in South Korea in many ways reflects the international development in end-of-life management policy. In the 1990s the recycling of four home appliances: TVs, washing machines, air conditioners, and refrigerators was regulated together with that of packaging materials under the *Act on the Promotion of Saving and Recycling of Resources* (APSRR). APSRR introduced the refund system (DRS) in which the producers paid deposits to a state fund that gave refunds back for the amount they recycled. The use of economic instrument was replaced by mandatory responsibilities when the law was revised in 2002. As the number and the types of EEE in Korean households increased, as shown in Table 1, the list of regulated items with yearly collection targets that the producers had to meet in Korea's EPR system increased from four to ten by 2006 (noting that fluorescent lamps were designated as a separate product group). These ten products were later subject to the 2008 *Act for Resource Circulation of Electrical and Electronic Equipment and Vehicles* (ARCEEEV). The new system dubbed Eco-Assurance System (EcoAS) further consolidated producer responsibilities by adding measures directing at the design of new products to the program and is going to include more items such as rice cookers, microwave ovens and vacuum cleaners in a near future.

This study reviews the continuously evolving WEEE program in South Korea in order to draw policy lessons about the efficacy of various approaches to implement EPR at the different stages of socio-economic development. The review was based largely on the documentary research. Legal provisions, statistics and findings from previous studies were supplemented by topical interviews and focus group discussions with researchers, government officers, recyclers, representatives of waste management associations and non-governmental organizations (NGOs). To verify the data and keep idealized and normative accounts in check, direct observations of the ground reality were made between March and August 2013.

This paper is organized into four sections. Second section describes the three phases of Korea's resource circulation policy. Third section provides a critical assessment of how EPR had been introduced in South Korea and discusses the impacts of the policy changes on the flows of materials and possible measures that can further improve the effectiveness of the program. The final section concludes the article.

## 2. Resource circulation policies in South Korea

Due to its limited natural resources and rapid industrialization, South Korea began to invest in organizational and technological developments to promote resource circulation as early as 1980 with the establishment of the Korea Resources Recycling Corporation (KORECO). However, there was no legal framework for resource circulation in the 1980s. Discarded materials from households and industries were regulated under the *Environmental Conservation Act* before the *Waste Management Act* (WMA) was promulgated in 1986. The development of a legal framework and a policy subsystem for resource circulation began after the promotion of the Environment Administration from an agency under the then Ministry of Health and Social Affairs into the Ministry of Environment (MOE) in 1990.

### 2.1. Producer-based deposit refund system

APSRR that introduced DRS in 1992 was promulgated in parallel with the revision of WMA. During this time the old way of maximizing waste removal and disposal services was in a crisis. The system could not keep up with the increase in MSW that grew by a factor of seven between 1970 and 1990. In 1992, each Korean generated about 1.8 kg of solid waste per day more than an average American at that time. With the population of over 43 million and 96,920 $km^2$ of land, finding landfill spaces for the growing amount of waste became a daunting task. A strategy was thus needed for landfill diversion (Park, 2007). Waste segregation was one of the many improvements that the 1991 revision of WMA tried to achieve.

The producer-based DRS was intended to divert certain materials from the mixed municipal waste stream by giving incentive to the producers to take back and recycling them. The measure primarily aimed at packaging waste but also covered large home appliances that began to occupy space in landfill. TVs and washing machines were regulated right from the start with air conditioners added in 1994 and refrigerators in 1997. Under DRS the producers of regulated products and packaging materials paid the deposits

[1] In the long run member states can choose between two targets: 65% by weight of EEE put on the market in the three preceding years or 85% of WEEE arising.