

Evaluating Sustainability of E-waste Treatment in Korea based on Life Cycle Assessment (LCA) Method

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INTRODUCTION

Electronic waste, so called E-waste is one of the fastest growing wastes in the world. It is very critical to properly treat E-waste, since they contain toxic materials such as mercury, lead or cadmium. When they are incinerated, noxious hormones and toxic materials that can cause cancer and genital troubles are produced. They also cause soil pollution when they are dumped to the landfill. In this regard, a proper treatment and recycling are required. In this research, we focus on the End of Life (EoL) stage of E-waste and evaluate sustainability of E-waste treatment in Korea, using Life Cycle Assessment (LCA) method.

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Every year, approximately 20~50 million tons of E-waste are produced worldwide. The amount of E-waste in Korea in 2008 is shown in Table 1.

<i>Product</i>	<i>Average life span (years)</i>	<i>Waste quantity (2008)</i>
TV	7.83	3,361,000
Refrigerator	7.69	3,930,000
PC	3.94	3,790,000
Mobile phone	2.53	18,275,000
Printer	4.21	1,345,000

Table 1 E-waste production in Korea

In Korea, the government has introduced Extended Producer Responsibility (EPR), which states that the producers of the product are responsible for taking back their products from the end users, in order to promote recycling. Recycled products not only prevent people from the toxic materials, but also bring economic benefits. From the recycled cellphone, for example, 16 usable metals including gold and palladium are extracted. One recycled cellphone value 2,500~3,400 won.

<i>Metal</i>	<i>Content and value estimated for a mobile phone</i>	
	<i>Weight (g)</i>	<i>Value</i>
Copper	16	\$0.03
Silver	0.35	\$0.06
Gold	0.034	\$0.40
Palladium	0.015	\$0.13
Platinum	0.00034	\$0.01

Table 2 Weight and value of precious metals in a mobile phone

In this paper, we evaluate the sustainability of one type of electronic waste, particularly in the end of life stage. We then compare the recycled E-waste and discarded E-waste. It is expected that the result will support private and public E-waste treatment companies.