

Korea Environmental Policy Bulletin

Extended Producer Responsibility (EPR)

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Summary

The Korean government introduced its “Extended Producer Responsibility” (EPR) system in 2000 that strengthened producers’ responsibility from the production stage up to collection and recycling.

EPR system is applied to four packaging materials (paper packaging, glass bottles, metal cans, and plastic packaging), lubricants, tires, fluorescent light bulbs, batteries and electronic products.

Performance rates of four major packaging materials for recycling obligations were exceeding 100% annually. With the expansion of EPR items subject to recycling and the establishment of recovery/recycling systems, the quantity of recycled items has increased approximately 46% since the commencement of enforcement. In addition, with the enforcement of EPR (2001-2008) total energy reductions amounted to 3,196,000 TOE, or approximately 2.6 trillion won in electricity costs.

Currently, the government is reviewing the establishment of per capita recycling goals as enforced in the EU in consideration of the characteristics of each recyclable item.

I. Background

Since the 1990s, Korean government has increasingly focused on waste reduction and recycling to address the growing amount of waste produced from its mass production and consumption oriented society. Such efforts resulted in the introduction of various policy initiatives, including the “waste separation & collection system” (1991), the “waste deposit and refund system” (1993), and the “volume based waste disposal system” (1995). The waste deposit and refund system introduced in the 1990s imposed deposit fees on producers for waste items, on the assumption that 100% of all products shipped would be collected and recycled, and producers would then be able to recover their deposit. However, in practice the system lacked effectiveness, as recovery of deposits was low. In the 2000s, policy goals and enforcement plans were devised to build a basis for a resource circulating society through

increased reduction and recycling of waste. To effectively enforce such plans and reach the associated policy goals, a more active role for producers was required.

As the world faced increasing environmental crises, including climate change and diminishing resources and energy supplies, governments increasingly saw a need to shift from a post facto system that focused on waste treatment, to a resource circulation system that connected the entire life cycle of products, from production and consumption, to recycling. Accordingly, it became necessary to increase responsibility for businesses from the production stage onwards to promote recycling. To this end, the Korean government introduced its “Extended Producer Responsibility” (EPR) system in 2000 that strengthened producers’ responsibility from the production stage up to collection and recycling.

II. Main contents

1. Items subject to recycling

Packaging materials subject to the EPR system include paper packaging, glass bottles, metal cans, and plastic packaging, while producers subject to recycling obligations include all producers or importers of products that use packaging, i.e. the producers of the items inside the packaging in question (cf. Table 1). As it is difficult to evenly distribute responsibilities among producers in the market, the main entity

responsible for the products in question is designated as subject to recycling obligations. However in cases where many small scale unspecified producers exist, e.g. for containers for agricultural, marine, and livestock products, the producer of the packaging is made subject to recycling obligations (2008 Environmental White Paper, Ministry of Environment, p.557). Items subject to the EPR system are based on the items subject to recycling under the previous deposit and refund system, with new items

determined and added as needed. Audio equipment and mobile phones were added to the list in 2005, printers, copiers, and fax machines were added in 2006, and manganese, alkali, and nickel-metal hydride batteries were added in 2008.

Table 1: Items and producers subject to recycling obligations (2010)

<p>Items subject to recycling obligations (Total 24 items)</p>	<ul style="list-style-type: none"> - Products: Tires, batteries (7 types), fluorescent light bulbs, lubricants, electronics products (10 types) - Packaging: paper packaging, glass bottles, metal cans, plastic (PET, PVC, PE, PP, PS, PSP containers/packing material, styrofoam buffer material) - Styrofoam packing material used as packing filler for electronic products - Styrofoam boxes for packaging agricultural, marine, and livestock products (limited to packaging for food and beverages, agricultural, marine, and livestock products, and medical products)
<p>Producers subject to recycling obligations</p>	<ul style="list-style-type: none"> - Products: Products from all businesses regardless of scale of manufacturing or import - Packaging materials: Packaging for products from manufacturers whose annual revenue exceeds one billion won, or from importers whose annual imports exceed 300 million won - Other systems exist that support the EPR system, including the separate disposal identification system, the empty container deposit and refund system, and obligations on sellers for collection of discarded products at no charge

Source: Korea Environment Corporation (KECO)

2. Recycling obligations

The producers subject to recycling obligations can perform their recycling obligations through (1) direct recovery and recycling, (2) contracting of recycling to a recycling business, or (3) through the Korea Waste Recycling Mutual Aid Association (KWRMAA). At present most producers pay recycling fees to the Association, which remits recycling expenses to recycling firms to fulfill the obligations of its members. Annual recycling obligations are imposed on packing filler for products with respect to the four major packaging materials, and recycling obligations rates are imposed based on the amount of recyclables

received versus shipment quantities. Recycling obligation rates are publicly disclosed every year, and are assessed in consideration of the annual quantity shipped, the quantity separated and collected, and recycling results, etc. Producers that fail to meet their obligations are subject to recycling fees, which are imposed within a scope of 130% of the actual recycling expenses (i.e. standard recycling expenses). Producers that exceed their obligations can “bank” their results for up to two years.

Recycling obligation rates by packing materials for 2010, were in descending order: Polyethylene Terephthalate (PET) bottles, at 76.4%, styrofoam at 76.0%, metal cans 75.6%, and glass bottles at 75.1%.

Table 2: Recycling obligation rates & long term recycling goals by year and product/packaging material

Item		Long term recycling goals (2012)	2005	2006	2007	2008	2009	2010	
Metal Cans	Steel cans	78.6	70	71	72	73	74	75.6	
	Aluminum cans	78.6	70	71.2	71.7	73	74	75.6	
Glass bottles		77.8	67.2	68.4	70.8	72.6	73.7	75.1	
Paper packaging		36	27.8	26.6	28	29.1	30.5	32.7	
Plastic packaging materials	PET bottles	Sole material	80.6	69.5	70.4	71.7	73.7	74.9	76.4
		Composite material	80.6	69.5	70.4	71.7	73.7	74.9	76.4
	Styrofoam		78.1	61.3	62.9	69	74.8	74.8	76
	Polystyrene paper		42.3	24.9	28	31.7	33.9	33.9	36.7
	Polyvinyl chloride (PVC)		66.4	48	48.4	55.6	58.3	59.8	60
	Sole material		80	50.2	52.8	58.5	62.8	65.3	70.2
	Composite material		60	36.8	38.7	41.4	43.3	47.6	51.7
Lubricants		72.2	68.7	68.7	67.6	67.7	67.7	69.2	
Tires		76.2	71.8	72	73.7	74.8	74.8	75.4	
Fluorescent light bulbs		30	20.9	20.7	22.5	23.1	24	26.1	
Batteries	Mercury batteries		60	25	29.3	38	49	49	60
	Silver oxide cells		56	25	25	30.9	37	39	42.4
	Lithium batteries		65	24.9	29.3	38	49	52	57.7
	Nickel-cadmium battery		40	24.6	24.6	25.7	29.1	31	33.3
	Manganese dry cells/alkali manganese dry cells		30	-	-	-	20	20.5	23.6
	Nickel-metal hydride batteries		30	-	-	-	25	25	28.9
Electronics products	Televisions 21		11.8	12.6	13.3	14.5	16	19	
	Refrigerators		25	14.1	16.9	17.3	18.9	20.6	22.1
	Washing machines		30	21.2	23.4	24.2	25.3	26.1	27.4
	Air conditioners		2.6	3.6	1.7	1.9	2.1	2.3	2.4
	Personal computers		14	8.5	9.4	9.8	10.3	11.1	12.3
	Stereos		20	10.2	12.7	13.1	14.9	15.5	17
	Mobile phones		25	11.9	15.4	16.5	18	19.8	22
	Printers		15	-	8.4	9.2	11.2	11.9	13
	Copiers		15	-	8.4	9.4	12.7	13.3	14.2
Fax machines		15	-	8.4	9.4	11.4	12.1	13.4	

Source: Ministry of Environment Notice No. 2006 - 219, Ministry of Environment Notification No. 2009 - 283, Ministry of Environment Homepage (http://www.me.go.kr/kor/info/info_view.jsp/gubun=3&code=A60402&inpymd=20100610183055)

III. Results of the EPR system

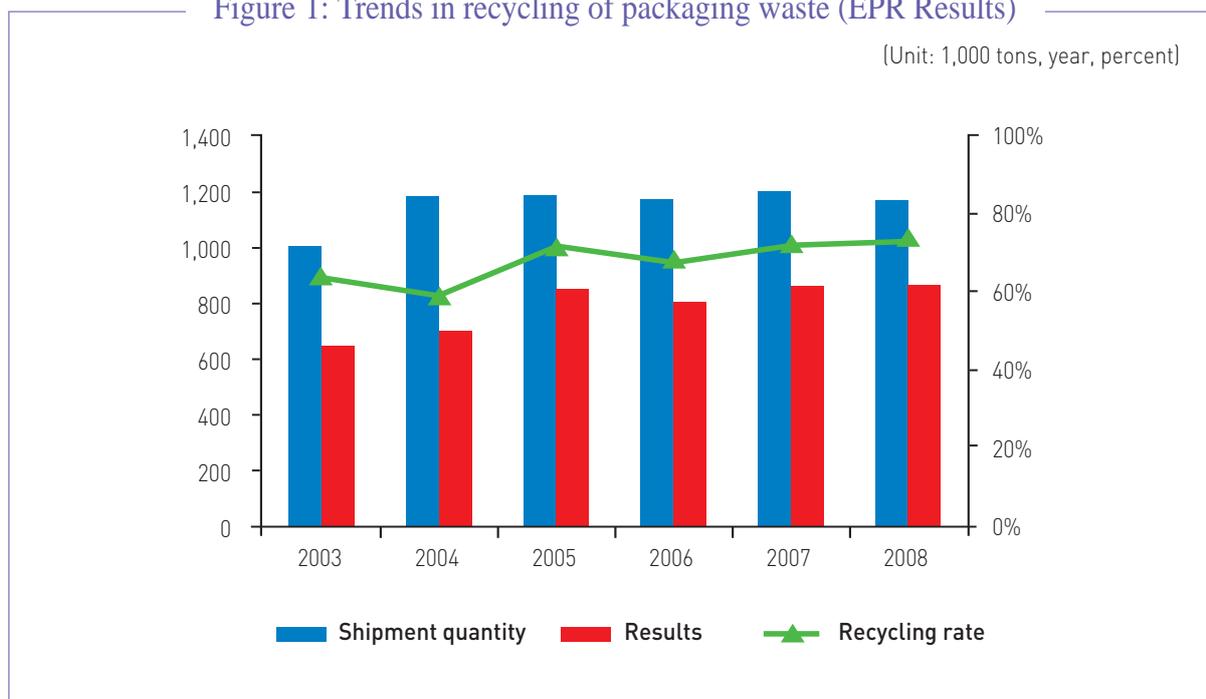
Korea lacks natural resources, and most energy and metals are imported from abroad (more than 95%). Accordingly, if discarded resources are recycled, Korea can simultaneously attain two goals, resource savings and environmental preservation. With the enforcement of EPR, Korea has been able to reduce the use of raw materials and replace the use of natural resources by recycling discarded products that would have otherwise been incinerated or landfilled. For example, one ton of ore contains only 5g of gold, while one ton of discarded mobile phones contains 400g of gold, 3kg of silver, and 100kg of copper.

1. Increased Recycling

Four packaging materials (paper packaging, glass bottles, metal cans, and plastic packaging)

have been the major items subject to recycling under the EPR system since 2003. Performance rates for recycling obligations were 100% in 2003, 104% in 2004, 123% in 2006, 115% in 2007, and 113% in 2008, with results exceeding 100% annually. Recycling rates vis-à-vis shipment of packaging materials fluctuated significantly year-on-year, with 64.2% recycled in 2003, and 73.2% in 2008, with an overall tendency towards increased recycling, and generally high rates of recycling. The quantity of packaging materials increased from 642,000 tons per year in 2003 to 853,000 tons per year in 2005 (plastic films were added in 2004), before increasing to 804,000 tons per year in 2006, 867,000 tons per year in 2007, and 865,000 tons per year in 2008; showing strong increases until 2005, and maintaining similar levels thereafter.

Figure 1: Trends in recycling of packaging waste (EPR Results)



	2003	2004	2005	2006	2007	2008
Shipment quantity	1,000	1,180	1,188	1,172	1,197	1,173
Results	642	701	853	804	867	865
Recycling rate	64.2%	59.4%	71.8%	68.6%	72.4%	73.7%

Source: Korea Environment Corporation, internal data, 2010

2. Reduction of use of raw materials and replacement of natural resources

With the expansion of EPR items subject to recycling and the establishment of recovery/recycling systems, the quantity of recycled items has increased approximately 46% since the commencement of enforcement (from 928,000 tons in 2001 to 1,368,000 tons in 2008). Per capita recycling for electronic products has increased approximately 3 times (from 0.72kg in 2001 to 2.3kg in 2008). For packaging materials such as PET, glass bottles, metal cans, and styrofoam, recycling is now near 80% (2008: PET: 80%, metal cans: 78%, glass bottles: 76%) due to the introduction of a collection and transportation system and the development of recycling technologies. Recycling of batteries (primary cells, nickel-metal hydride batteries etc.) increased 2.5 times since their inclusion in the EPR system, which allowed extraction of valuable metals whose value amounted to more than 20 billion Won per year of import substitution. Previously all plastic film was incinerated or landfilled; however, since the inclusion of plastic film in the EPR system in 2004, 75% of total production has been recycled. Altogether, the recycling of ERP items enabled the creation of approximately 1.7 trillion won of value -added,

while saving processing expenses (i.e. opportunity costs) of approximately 1.9 trillion Won for incineration and landfilling.

3. Environmental improvements for products

Since the enforcement of the EPR system, the production of environmentally friendly products by businesses has greatly expanded. The number of products with environmental certifications has increased approximately 18 times (from 326 products in 2001 to 6,005 products in 2008), while products certified as “Good Recycled” (GR) increased by approximately 48% from 166 products in 2001 to 245 products in 2008.

4. Building a foundation for the recycling industry

Recycling infrastructure has expanded with the establishment of five regional Home Appliances Recycling Centers (1998-2008), “refuse plastic fuel” (RPF) Facilities (2003), and mutual aid association recycling facilities like metal can recycling worksites (2001-2008). A system for activating recycling was also devised by operation of recycling project mutual aid associations (total 11 locations). The foundation of mutual aid associations for each item in particular allowed

Figure 2:

Environmentally friendly certification mark, environmental certificate	Good Recycled Product (GR) Certification
	
<p>- Official approval as a product that consumes the minimum amount of resources & energy and discharges the lowest amount of pollutants during production</p>	<p>- GR (Good Recycled Product): Government certification of product quality and environmental friendliness as a recycled product</p>

control of excessive competition between small recycling businesses, while improving the quality of recyclables and increasing transparency in the recycling market. Furthermore, continuous support, including expansion of the scale of recycling support funds (from 29.3 billion in 2001 to 43.9 billion in 2008) to recycling businesses, allowed the number of recycling firms to grow (from 418 in 2001 to 550 in 2008). At the same time the recycling industry has been gradually activated and the scale of the recycling market has grown through the provision of long-term low interest loans for development of recycling facilities and technologies, (1994- 827.3 billion Won already invested), and the pursuit of government-sponsored recycling related R&D projects (2000-2010, 47.2 billion won).

In addition, the distribution of collection boxes at housing complexes nationwide (Paper Pack Association, 2009), and the building of joint transportation systems between local governments and associations (Battery Association, 2008-) has contributed to the

activation of the collection/transportation system, as well as the promotion of research projects on recycling (2001-2008, approximately 2 billion won). The creation and operation of associations of producers and recycling firms has greatly contributed to activation of recycling systems.

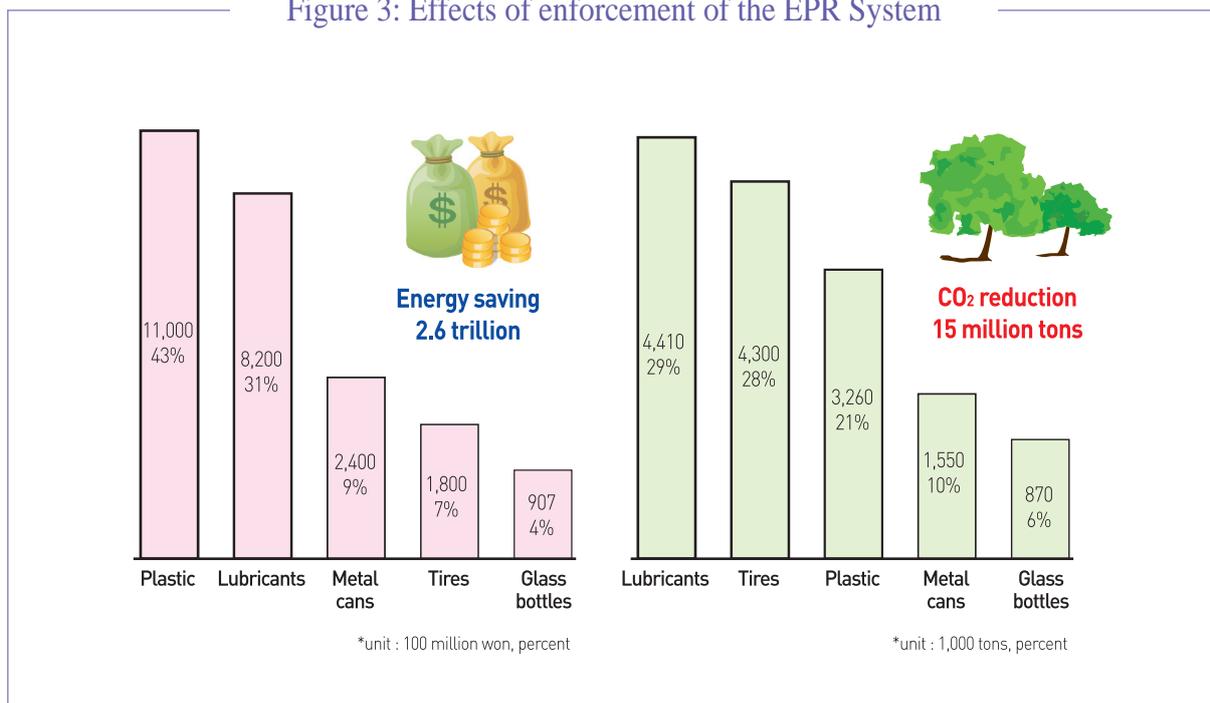
5. Energy savings and greenhouse gas reduction

With the enforcement of EPR (2001-2008) total energy reductions amounted to 3,196,000 TOE, or approximately 2.6 trillion won in electricity costs. By Item, packaging materials (paper packaging, glass bottles, metal cans, and plastic) accounted for 63% of the total, implying that separation of recyclables is a short cut to energy savings. Among the products recycled, lubricants account for 31%, and these have higher value and strong energy saving effects. Furthermore, the reduction of items with a high thermal recycling weight, such as lubricants and tires, was more than 50%, while high recycling of plastic resulted in a 21%

reduction in production. With the enforcement of the EPR system approximately 15,240,000 tons of greenhouse gas reduction was attained,

corresponding to the carbon absorbed by a 30 year old pine forest with an area of 2267ha (1920 times the area of Seoul's Yeouido) for a year.

Figure 3: Effects of enforcement of the EPR System



Source: Ministry of Environment, Internal Data, EPR Result Appraisal, 2010

IV. Future Plans

10 years after the introduction of the EPR system in 2000, EPR has firmly taken root throughout society. In the next 10 years, the Korean government hopes to present a future vision for advancement of the EPR system and to prepare and promote new development proposals. Currently, the government is reviewing the establishment of per capita recycling goals as enforced in the EU in consideration of the characteristics of each recyclable item.

1. EPR items subject to recycling and expansion of responsible parties

With increased social demand for circulation of resources, the Korean government now plans to expand both the scope of items subject to recycling obligations and producers subject to obligations. Recycling of automobiles is now being

shifted from the current system of processing discarded vehicles to inclusion in the EPR system, to increase recycling rates (from 85% in 2008 to 95% in 2015), as well as improved handling of discarded coolants. The EPR system will impose recycling responsibilities on manufacturers and importers of automobiles from 2012. The government is also planning to expand EPR items subject to recycling for electronics products (from the current 10 types to all items as in the EU), and to gradually increase the obligatory recycling quantity (from 2.3kg/capita in 2008 to 2.9kg/capita in 2013 to 4kg/capita in 2020). Korea is now preparing to include secondary lithium batteries (which are currently excluded from EPR items) from 2011, and is preparing standards and methods on recycling of New & Renewable Energy Cells (fuel cells etc.) to be enforced from 2012. The government is imposing obligations for collection of discarded products (obligatory rate/obligatory quantity) on large-scale sellers like big box and online retailers in line with the shift from direct purchase of products from manufacturers and importers to purchase from large scale retailers (who account for 35% of sales as of 2008), and is also imposing transfer obligations to producers' recycling centers.

2. Conversion of waste fees to EPR

Plastic items with relatively high recycling rates will be transferred to EPR in stages. Currently, items with high recycling rates and existing collection and transportation systems among plastic products are planned to be included in the EPR system. In particular, items for which voluntary agreements have been concluded (18

types) will be transferred to EPR in stages after appraisal of results.

3. Increased effectiveness of collection and transportation of discarded resources

First, collection responsibilities for local governments will be strengthened to enhance effectiveness of collection and transportation, while cooperation systems will be established between producers and local governments. More specifically, for items with low collection rates, like batteries and fluorescent light bulbs, a separate collection system shall be prepared while a standing collection system with external channels (e.g. convenience stores, visiting teachers, etc.) shall be established, strengthening local governments' role. Installation of "home appliances collection centers" to transfer and process discarded electronics products collected by local governments at recycling centers are also being pursued (2010-2015) in tandem.

Second, the establishment of a wide area collection system and the installation of wide area collections facilities shall be promoted. To leverage economies of scale, a joint collection system shall be built and operated from 2011 for adjoining local governments. In other words, local governments shall determine the types of items to be recycled and the schedule thereof, or private businesses shall be jointly entrusted. To this end the entire country shall be divided into regions in consideration of separate collection by local governments, and a regional public selection place shall be determined (2012-).

Third, unmanned automated collection systems shall be installed and operated. Automatic

collection of valuable packaging waste (cans, PET bottles, glass bottles, etc.) shall be established, and carbon points or a “mileage” system shall be operated for the disposer. The establishment and operation of a collection system shall be first performed as a model project at public institutions, and big box retailers in 2011, and then pursued

widely after review of feasibility (2012-). If the collection system is pursued, mutual aid associations shall be responsible for installation of collectors (20-30 million Won/unit), and collection and transportation shall be performed by recycling firms.

Appendix

Table 1: ERP items subject to recycling and standard recycling costs

Item	Type and material	Standard recycling cost
1. Food; agricultural, marine, and livestock products; detergents; toiletries; medicines; butane gas products; insecticides and germicides	a. Paper packaging	₩185/kg
	b. Glass bottles	₩34/kg
	c. Metal cans 1) Steel cans 2) Aluminum cans	₩151/kg
	d. Plastic packaging materials 1) Styrofoam (sole material) packaging	₩317/kg
	2) Polyvinyl chloride (PVC)- sole and composite packaging materials	₩981/kg
	3) Polyethylene phtalate (PET) bottles a) Transparent PET bottles- sole material	₩178/kg
	b) Colored PET bottles- sole material	₩235/kg
	c) PET bottle- composite material	₩360/kg
	4) Other single material containers and trays	₩327/kg
	5) Other composite material packaging materials & films/sheet type single and composite material	₩467/kg
2. Electronics products shipping filler, agricultural, marine, and livestock product boxes	Styrofoam single and composite packing materials	₩317/kg
3. Batteries	a. Mercury cells	₩39.6/g
	b. Silver oxide cells	₩35.5/g
	c. Nickel-cadmium cells	₩0.78/g
	d. Lithium batteries (limited to the primary cells)	₩0.8/g
	e. Manganese dry cells, alkaline manganese dry cells	₩0.35/g
	f. Nickel-metal hydride batteries	₩0.16/g

Item	Type and material	Standard recycling cost
4. Tire	Tires	₩30/kg
5. Lubricants	Lubricants	₩20/l
6. Florescent light	Florescent light bulbs	₩143/pc
7. Electronic products*	a. Televisions	₩165/kg
	b. Refrigerators	₩131/kg
	c. Washing machines	₩122/kg
	d. Air conditioners	₩89/kg
	e. Personal computers	₩165/kg
	f. Audio equipment	₩194/kg
	g. Mobile phones	₩2,634/kg
	h. Printers	₩367/kg
	i. Copiers	₩239/kg
	j. Fax machines	₩378/kg

Source from: Table 6, standard recycling costs by product/packing material pursuant to Article 27 of the Enforcement Ordinance of the Act on Saving of Resources and Promotion of Recycling, Table 5, recycling unit costs for electric and electronics products pursuant to Article 19 of the Enforcement Ordinance of the Act on Resource Circulation of Electric and Electronic Products and Vehicles

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