FACTS TO ACT ON

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ASIAN COUNTRIES JUMP ON THE EPR BANDWAGON

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Summary

Many Asian countries have embraced EPR principles. Japan, Korea, and Taiwan have introduced EPR programs for a variety of items including for containers and packaging, disposable diapers, appliances, and consumer electronics.

Since their introduction, many of the laws have been modified as the countries seek to develop effective legislation. Results have been mixed. For example:

- In response to Japan's Law for the Promotion of Sorted Collection and Recycling of Containers and Packaging, curbside collection of glass bottles, PET bottles, steel cans, aluminum cans, and paper packaging for recycling has increased 27% from 1.25 million tons in 1997 to 1.59 million tons in 2000. Industry re-manufactured 1.52 million tons of this material. However, environmental activists charge that the system places little of the financial burden for recycling on manufacturers, leaving municipal governments to bear most of the burden.
- In Korea's deposit-refund system, producers and importers, not consumers, pay the deposits into a "Special Account for Environment Improvement" and are paid refunds from the Account based on the recovery levels achieved for their products. Unfortunately, the deposit-refund system failed to motivate manufacturers to collect and treat waste because the deposit was much less than the cost for collection and treatment of wastes. Therefore, manufacturers found it more economic to forfeit deposits than recycle. The government plans to increase deposit amounts.
- Under Taiwan's deposit-refund system, the country reached an 80% recycling rate for PET bottles within three years of the program's initiation. This success has come at the cost of nearly bankrupting the fund set up to finance the refund system and collection and recycling of the bottles.

Extended producer responsibility (EPR), first formally introduced in Sweden in 1979, has spread to Asia. (In 1979, a Swedish law mandated aluminum can recycling.[1]) Since this time, numerous countries have enacted EPR policies. In Japan, the government has introduced EPR policies for containers and packaging, and some household appliances. The Japanese legislation is a modified form of EPR that promotes shared responsibility for end-of-life items among manufacturers, importers, retailers, and consumers. EPR strategies adopted by the Republic of Korea government include deposit-refund systems, non-refundable product fees, and design requirements for packaging. The country also uses restrictions on the distribution of disposable goods and eco-labeling to leverage environmentally preferable behaviors amongst manufacturers and importers. EPR policies in place in Taiwan include deposit-return systems, and mandatory product take-backs. Taiwan also uses environmental labeling to encourage manufacturers to design and supply environmentally friendly products.

Japan

More than 126 million people live in Japan, a country with a land area (145,900 square miles) similar to the state of Montana. Annual municipal waste generation totals approximately 50 million tons and the country has less than ten years of remaining landfill capacity at current disposal levels. Furthermore, Japan is a major consumer of mineral resources but has few domestic supplies. Consequently, the country is one of the world's largest importers of copper, zinc, lead, iron, aluminum, and nickel.

To address Japan's scarcity of natural resources, many communities established voluntary curbside recycling of household materials such glass bottles, steel cans, aluminum cans, and

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newspaper. The communities usually sold the collected commodities to recyclers for what they considered a reasonable fee. However, in the early 1990s, prices paid for the collected commodities dropped and sometimes became negative, causing communities to have to pay recyclers to take their collected materials. Communities and individuals requested the government take action to address the situation. In response the government developed its first mandatory EPR policy, the June 1995 Law for the Promotion of Sorted Collection and Recycling of Containers and Packaging.[2] The law, which went into effect in 1997, was intended to shift the negative costs for materials collected in community recycling programs from the communities to product producers.

The enactment of the Law for the Promotion of Sorted Collection and Recycling of Containers and Packaging paved the way for discussion of EPR for other materials. In 1997 and 1998, the Industrial Structure Council of the Ministry of International Trade and Industry (MITI),[3] the Living Environment Council of the Ministry of Health and Welfare (MHW), and the Environment Agency collaborated to draft the Specified Household Appliances Recycling (SHAR) Law. Representatives of manufacturers, retailers, waste dealers, local governments, and consumer groups also participated in the process. For example, the representatives of the Association of Electrical Home Appliances attended the meetings to ensure the industry's positions were considered. The Japanese Diet passed the SHAR Law in May 1998 with implementation required by 2001.

Law for the Promotion of Sorted Collection and Recycling of Containers and Packaging

In Japan, container and packaging waste comprises nearly 60% of household waste by volume. The Law for the Promotion of Sorted Collection and Recycling of Containers and Packaging clearly assigns responsibility for packaging materials in household waste among consumers, municipalities, manufacturers, bottlers, and importers (See Table 1).

Table 1: Responsibility for Packaging Materials as Assigned under Japan's Law for the Promotion of Sorted Collection and Recycling of Containers and Packaging

Municipalities	· Design and implement a program for source-separated collection of packaging · Prepare materials for market
Consumers	· Sort packaging according to municipal criteria
Manufacturers, bottlers, and importers	· Recycling of materials collected by municipalities · Meeting government-set recycling targets · Develop recycling plants · Eventually, recycle all materials from products collected

Note: In each case, the responsibilities are both physical and financial.

Industry fought to limit its responsibility under this system. Furthermore, nearly two-thirds of local governments had already implemented systems for separation and collection of recyclable materials from household trash prior to the law's enactment. The legislation, modeled on the French deposit-return system, was designed to limit disruption of these existing systems including safeguarding the jobs of local government workers employed in waste management.

Initially, the law required only large companies to recover glass bottles and PET containers. As of April 2000, all paper and plastics packaging was included in the system and small and medium enterprises became responsible for their packaging. Steel, aluminum cans, and corrugated cardboard were not covered by the law because these materials have a positive value and were already recycled. Furthermore, refillable milk and beer bottles were exempted after industry documented that these containers are reused more than ten times on average as a result of existing programs. For example, three beer manufacturers that use the same bottles implemented their own deposit-return system. The deposits equal five yen per bottle and 200 yen per crate, which holds either 20 or 30 bottles. This deposit is reimbursed when the bottles or crates are returned.

The law requires each municipality to establish criteria and implement a program for source-separated collection of packaging waste in its jurisdiction. Most communities have introduced or expanded curbside recycling programs to meet these requirements. Once they have collected materials, municipalities must prepare them for market. This "intermediate treatment" can include washing collected bottles; removing contaminants, such as, caps and labels; and baling. Furthermore, municipalities are responsible for the additional cost of this separate collection and processing. (Some municipalities have appealed to central government to persuade industry to share these costs, but so far the government has not required industry to do so.)

Residents are required to sort packaging waste according to the established criteria. In response to the law, the number of communities collecting materials for recycling, the types of materials collected, and the tonnage of collected materials have expanded. For example, in 1997[4], 1,610 communities collected 292,775 tons of clear glass from residents. By 1999, the number of communities with collection programs had risen to 1,991 and the collected tonnage was 326,110. Table 2 and Chart 1 show the growth of curbside recycling programs in the first years the law was in effect.

Table 2: Residential Curbside Collection Tonnage for Specified Recyclables in Japan

	1997	1998	1999	2000
Clear glass	292,775	322,284	326,110	352,388
Brown glass	243,916	274,374	290,127	312,539
Other glass	107,533	136,953	149,332	164,551
PET bottles	21,361	47,620	75,811	124,873
Steel cans	464,662	471,638	471,127	484,752
Aluminum cans	112,527	121,214	128,541	135,910
Paper packaging	6,644	8,939	9,574	12,565

Source: Japanese Ministry of the Environment web page at: http://www.env.go.jp/recycle/yoki/jisseki_h12/01.html, January 25, 2002.

The new recycling programs have proven difficult for some residents. For example, when

Chart 1: Growth in the Number of Japanese Communities Collection Specified Items in Curbside Recycling Programs

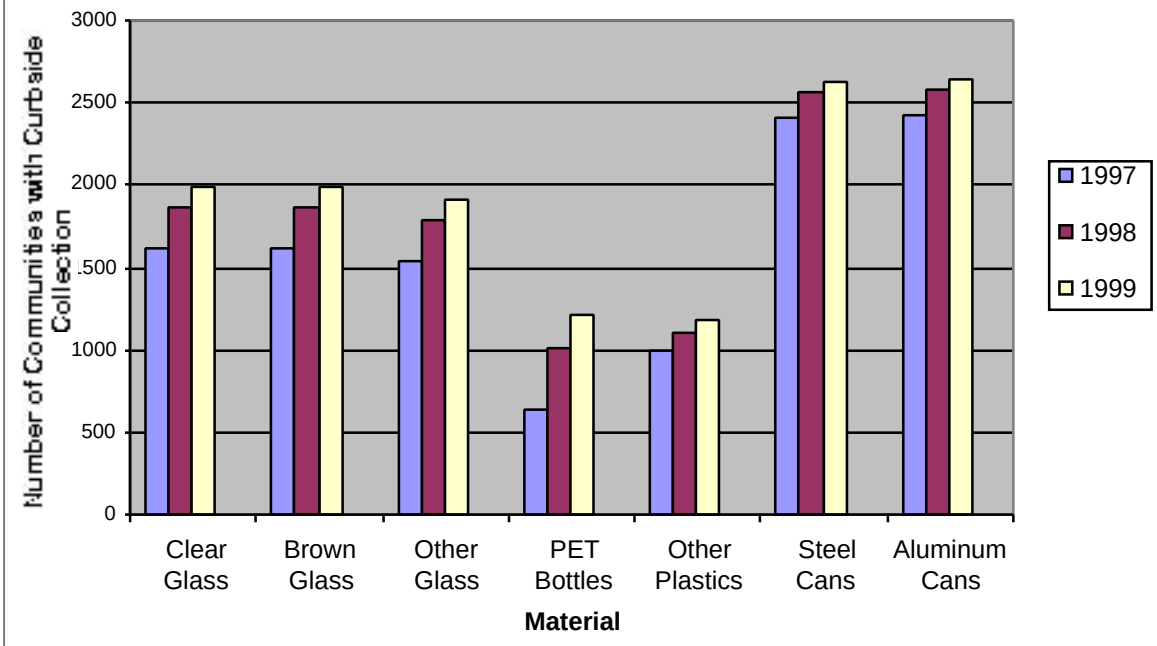

Table 3: Japan's 2000 Recyclables Collection Goals, Collection Achieved, and Tonnages Re-Manufactured

Material	Collection Goal (tons)	Collection Achieved (tons)	Re-Manufactured (tons)
Glass	1,008,364	829,476	779,647
PET Bottles	103,491	124,873	117,877
Steel cans	576,461	484,752	476,177
Aluminum cans	172,889	135,910	132,386
Paper packaging	28,065	12,565	12,071

Source: Japanese Ministry of the Environment web page at: http://www.env.go.jp/recycle/yoki/jisseki_h12/02.html. January 25, 2002.

Nagoya implemented a new system for trash and recyclables on August 7, 2000, the city issued a 31-page booklet to explain the system. The system requires residents to deliver some recyclables to special collection stations weekly, put other materials in special bags the city collects twice a month, and deliver still other recyclables to retail outlets. Not surprisingly, in the first week after the new program began, an average of between 300 and 350 residents per day called a special hot line set up to answer questions on the new system.[5]

Industry is responsible for recycling wastes after local authorities collect them. Specific industry responsibilities include covering the cost for recycling collected materials; fulfilling recycling targets set by the government; making efforts to establish recycling plants; and eventually taking back and using all the collected materials from their products.

The recycling targets are set to equal the total capacity of the plants that are currently available for recycling processing in Japan. For example, the government estimated the available national capacity for PET recycling to be 73,000 tons in 2000. With municipal generation of PET at about 240,000 tons for the same year, the recycling rate corresponds to approximately 30%. The government determines the rates for each type of container/package for each industrial sector (e.g., food, soft drinks, pharmaceuticals, and cosmetics).[6] Table 3 lists the collection goals for covered recyclables and actual collection and re-manufacturing data for fiscal year 2000.

The recycling targets will increase as recycling capacity is developed in the country. Numerous new recycling facilities have been announced and/or developed since the law was enacted. For example:

- Mitsui, Nippon Steel, and other partners developed Nishi-Nihon PET-Bottle Recycle Company, Ltd. The company's first PET processing facility began operating in July 1998, with an annual capacity of 8,000 tons.
- In December 2000, Teijin Limited, a leading Japanese manufacturer of synthetic fibers, announced plans to establish new recycling facilities and retrofit an existing factory to create a plant that will process around 30,000 tons of PET bottles per year. The company expects the new facility to be operational by 2002.

Many packaging producers, bottlers, and importers have chosen to assume their responsibilities under the Law for the Promotion of Sorted Collection and Recycling of Containers and Packaging through membership in a third party organization, the Japan Container and Package Recycling Association (JCPRA), a non-profit public foundation. Member businesses pay recycling fees to fund the Association. The fees are based on the amount of containers and packaging sold by each company in the previous year and the total capacity of the plants that are currently available for recycling processing in Japan.[7] Table 4 presents the fees member businesses pay JCPRA.

Table 4: Japanese Recycling Fees for Packaging and Containers (Effective April 1, 2000 - March 31, 2001)

Material	Fee (Yen/kg)	Fee ($US/lb)
Glass bottles (flint)	4.151	0.016
Glass bottles (amber)	7.682	0.029
Glass bottles (other colors)	8.096	0.030
PET bottles	88.825	0.332
Plastic containers and packages (film, etc.)	105.000	0.392
Paper containers and packages	58.636	0.219

Note: 1 Japanese yen = US$0.00824
Source: Akira Ueno, Chief Executive Director, Japan Container and Package Recycling Association; "Presenting the Formula to Calculate the Japanese Recycling Fee," available at the Science Applications International Corporation web site: http://www.saic-epak.com/news2/JapanRec.htm

As of 1999, more than 500 businesses had entered into contracts with JCPRA for recycling of their packages. These companies represent the largest packaging producers in the country. As the scope of the law expands and small and medium size enterprises enter the system, the Association may contract with more than 200,000 companies.

Under the current system, member companies consign their recycling obligation to the Association by paying the appropriate fees. Local governments may either deliver collected materials to recycling processors or request JCPRA to arrange for its recycling. JCPRA then contracts with private recycling businesses nationally through an open bid process for the processing of materials.

JCPRA's budget for fiscal year 2000 was approximately 28 billion yen. In Japan, where municipalities continue to pay for collection, municipal costs must be added to the JCPRA fees to arrive at the total cost of the system. According to calculations by the Allied Japanese Groups Working on the Issues of Environment, manufacturers cover less than one cent per bottle of the costs for recycling PET bottles, while municipalities' costs for collection and baling averages approximately 25 cents per PET bottle handled.[8]

Specified Household Appliances Recycling (SHAR) Law

The SHAR law, effective in 2001, provides for the take-back of refrigerators, air conditioners, TVs, and washing machines. Approximately 80% of the items covered under the SHAR law had already been collected under the 1991 amendments to the Waste Management Law. The new law was enacted in order to increase recovery of the remaining 20% of covered goods.

The SHAR law divides responsibility for covered products among producers and/or importers, retailers, local governments, and consumers. The law requires retailers and local governments to accept covered end-of-life appliances from consumers, for a fee. Retailers must take back products they themselves sold and old products when they sell similar new products. Local governments must collect covered appliances retailers will not accept. The government set the fees to cover industry's actual costs for take-back, transportation, and recycling. They are (in U.S. dollars): washing machine, $24; air conditioner, $35; refrigerator, $46; and television, $27. Manufacturers and importers must assume physical responsibility, including collection from retailers and local governments and recycling, for their brands of end-of-life products. Manufacturers and importers must create and fund designated legal entities for the recovery of orphaned products (products of brands no longer produced or imported into the country). Many Japanese manufacturers began pilot collection and recycling projects prior to 2001 in anticipation of the EPR mandate.[9]

The SHAR law sets recycling targets for iron, copper, and aluminum from all collected products and glass from televisions. The targets are more than 60% for air conditioners, 50% for washing machines and refrigerators, and 55% for televisions.

One of the reasons the Japanese government allows industry to pass financial responsibility for household appliance recycling to consumers is the hope that they may realize how much it costs to throw away a product. The cost may lead consumers to reconsider disposing of a product that still functions or is repairable. No research has verified whether the fees have had this effect. Such an effect may be difficult to detect because consumers may still replace products but simply choose to stockpile older products in order to avoid the fees.

The SHAR law has spurred manufacturers to invest in appliance recycling facilities and explore "design for the environment" practices. For example, Panasonic has reduced the number of components in its televisions and the number of plastic resin types in many of its products in order to facilitate recycling. In fact, a Japanese researcher reported that three out of five companies interviewed said that the enactment of the SHAR Law was a strong incentive for them to promote Design for the Environment.[10]

As of May 2001, it was too early to evaluate the impact of this law on recovery levels.

The Republic of Korea

Article 35 of the Republic of Korea's Constitution states that all people have the right to live in a healthy and pleasant environment. Yet, rapid urbanization and industrialization, high population density, and increasing affluence have contributed to widespread environmental degradation. Like many other industrialized nations, Korea has experienced a shift from refillable containers to disposables. For example, Seoul Milk, the last Korean company to use a refillable glass bottle for milk, switched to paper cartons in 1989.

Waste management poses a particular challenge in the country. The nation is one of the most densely populated in the world. Population density and mountainous terrain limit land availability for waste disposal facilities. Furthermore, South Korean residents' per capita municipal solid waste generation rates have been historically high compared to other countries with similar gross domestic products.[11]

The Act Relating to the Promotion of Resource Saving and Reutilization, enacted December 8, 1992, and amended November 22, 1995, gives the federal government broad powers to implement programs, including those embodying the principles of extended producer responsibility, that support development of a sustainable waste management system. EPR and product stewardship strategies adopted by the Korean government include deposit-refund systems, non-refundable product fees, restrictions on the distribution of disposable goods, design requirements for packaging, and eco-labeling.

Deposit-Refund System

Korea's deposit-refund system became effective January 1992. Unlike deposit-refund systems in the United States and Europe, producers and importers, not consumers, pay the deposits into a "Special Account for Environment

Table 5: Korea's Deposit-Refund System

Product	Type and/or size	Deposit (won)	Deposit (US¢)
Food/drink, liquor, and medicine packaging smaller than 20,000 ml	***Paper***		
	≤ 250 ml	0.3 won per package	0.02¢ per package
	> 250 ml	0.4 won per package	0.03¢ per package
	Metal cans		
	With push-down attached tabs	2 won per can	0.15¢ per can
	With detachable tabs	5 won per can	0.38¢ per can
	Butane gas containers	5 won per can	0.38¢ per can
	Glass bottles [1]		
	≤ 100 ml (medicines only)	1.5 won per bottle	0.11¢ per bottle
	≤ 350 ml	2 won per bottle	0.15¢ per bottle
	> 350 ml	3 won per bottle	0.23¢ per bottle
	PET bottles [2]		
	≤ 500 ml	4 won per bottle	0.30¢ per bottle
	500 – 1500 ml	5.5 won per bottle	0.41¢ per bottle
	> 1500 ml	7 won per bottle	0.53¢ per bottle
Detergent packaging smaller than 20,000 ml	***PET bottles***[3]		
	≤ 500 ml	4 won per bottle	0.30¢ per bottle
	500 – 1500 ml	5.5 won per bottle	0.41¢ per bottle
	> 1500 ml	7 won per bottle	0.53¢ per bottle
Batteries	Mercury	120 won per battery	9.0¢ per battery
	Silver oxide	75 won per battery	5.63¢ per battery
Tires	Large	450 won per tire	33.75¢ per tire
	Medium and small	130 won per tire	9.75¢ per tire
	Motorcycle	50 won per tire	3.75¢ per tire
Automotive lubricants	Applies only to 70% of the production volume	25 won per liter	1.88¢ per liter
Home appliances	Television sets	38 won per kg	2.85¢ per kg
	Washing machines		
	Air conditioners		

Source: "Environmental Protection in Korea," Republic of Korea Ministry of Environment, available at http://www.moenv.go.kr/english/tit08/eng8.html.

Notes: 1 won = ~0.075¢US as of April 6, 2001.

[1]For medicine bottles with separable cap strips the deposits are: 4 won per bottle more than 100ml but less than 350ml, and 6 won per bottle more than 350ml.

[2]PET bottles with separable cap strips carry the following deposits: 5 won per bottle less than 500ml, 6.5 won per bottle more than 500ml but less than 1500ml, and 8 won per bottle more than 1500ml.

[3]PET bottles without separable cap strips and base cups made of different materials from the container are subject to the following deposits: 5 won per bottle less than 500 ml, 6.5 won per bottle more than 500 ml but less than 1500 ml, and 8 won per bottle more than 1500ml. PET bottles with separable cover strips and base cup made from different materials from the container carry the following deposits: 6 won per bottle less than 500 ml, 7.5 won per bottle more than 500 ml but less than 1500ml, and 8 won per bottle more than 1500ml.

Improvement." They are required to collect and treat their waste and the Account reimburses them according to the recovery rate achieved. The government did not set criteria for how materials subject to deposits were to be collected. (Each municipality operates its own trash and recyclable collection program.) The products covered under the system were modified in June 1993 and December 1996. Table 5 lists products subject to the deposit-refund system and their respective deposit amounts.

In 1993 the Ministry of the Environment created the Korea Resources Recovery and Reutilization Corporation. The Corporation is responsible for collecting and sorting discarded plastics, paper, scrap iron, and agricultural pesticide containers; enforcing recycling laws; and managing the funds in the Special Account for Environment Improvement. The Corporation also plays a central role in the development of new recycling capacity through research; construction of recycling centers, and processing and manufacturing facilities; and providing financial and technical support for private-sector recycling industries.

In 1995, the Korea Resources Recovery and Reutilization Corporation refunded only 13.7% of deposits manufacturers and importers owed to the Special Account for Environment Improvement. In general, the deposit-refund system failed to motivate manufacturers to collect and treat waste because the deposit was much less than the cost for collection and treatment of wastes. Therefore, manufacturers found it more economic to forfeit deposits than recycle. The Korean Ministry of Environment has announced plans to gradually increase deposit amounts.

Table 6: Korea's Waste Treatment Charges

Product	Charge (South Korean won)	Charge in US Cents
Toxic substance container, under 500ml	6.0 won per unit	0.45¢ per unit
Toxic substance container, over 500ml	11.0 won per unit	0.83¢ per unit
Cosmetic container, glass bottle, under 30ml	1.0 won per unit	0.075¢ per unit
Cosmetic container, glass bottle, between 30ml and 100ml	3.0 won per unit	0.23¢ per unit
Cosmetic container, glass bottle, over 100ml	4.5 won per unit	0.34¢ per unit
Cosmetic, spray metal container	8.0 won per unit	0.60¢ per unit
Cosmetic, other metal container	4.0 won per unit	0.30¢ per unit
Cosmetic, plastic container	0.7 won per unit	0.053¢ per unit
Confectionery packaging, up to 3 composite materials	6.0 won per unit	0.45¢ per unit
Confectionery packaging, 4 or more composite materials	12.0 won per unit	0.90¢ per unit
Lithium, cadmium and nickel batteries	2.0 won per unit	0.15¢ per unit
Insecticide container, under 500ml	7.0 won per unit	0.53¢ per unit
Insecticide container, over 500ml	16.0 won per unit	1.20¢ per unit
Antifreeze	30.0 won per liter	2.25¢ per liter
Fluorescent lamp, low-mercury lamp	6.0 won per unit	0.45¢ per unit
Fluorescent lamp, other	8.0 won per unit	0.60¢ per unit
Chewing gum	0.27% of sale price	0.27% of sale price
Diaper	1.2 won per unit	0.09¢ per unit
Plastic – polyacetal resin	0.35% of sale price	0.35% of sale price
Plastic -- other	0.7% of sale price	0.7% of sale price
Cigarettes	4.0 won per package	0.30¢ per package

Source: OECD Database on Environmentally Related Taxes, Database at http://www.oecd.org/env/policies/taxes/index.htm. March 6, 2001

Some industries have made more aggressive efforts to recycle than others have. In 1996, largely due to the establishment of a recovery and recycling system for metal cans instituted by producers, the total amount of refunds rose to 29.3% of the total amount of deposits due. Metal can producers have also changed their production as a result of the deposit-refund system. They increased production of metal cans with "push-down" type tabs (deposit of 2 won per container), while production of cans with removable tabs (deposit of 5 won per container) decreased.

Costs

In 1995, producers and importers owed the Special Account for Environment Improvement 32,335 million won in deposits and received refunds of 4,430

million won from the Account. In 1996, the figures rose to 34,016 million won in deposits due, and 9,970 million won in refunds paid to firms that recycled.

The Korea Resources Recovery and Reutilization Corporation distributes some unclaimed deposits to local governments, schools, military units, and community organizations to implement collection programs. In 1996, the Corporation made numerous such grants, totaling 516 million won. The remainder of the Special Account for Environment Improvement funds the Korea Resources Recovery and Reutilization Corporation's other programs.

Table 7: Regulated Disposable Goods in the Republic of Korea

Workplace	Regulated Items
Restaurants and cafeterias (with serving spaces larger than 33 square meters)	Prohibited from using disposable cups, containers, and plates, wooden chopsticks, toothpicks, disposable spoons, forks, knives, etc. Must not circulate advertising leaflets coated with synthetic resin
Department stores, shopping centers, wholesale shops, and shops with sales floor space larger than 200 square meters	Prohibited from distributing free plastic bags and shopping bags (can only be purchased by customers) Must not circulate advertising leaflets coated with synthetic resin
Food manufacturing and processing businesses/spot sales food manufacturing and processing business	Prohibited from using disposable lunchboxes made of synthetic resin
Lodging facilities with more than seven rooms and public baths	Prohibited from providing free disposable shaving sets, toothpaste, shampoo, and hair conditioner.

Source: Green Korea 1999, Republic of Korea Ministry of Environment, available at http://www.moenv.go.kr/english/tit00/eng10.html.

Non-refundable Product Fees

In 1992, the Republic of Korea established a "Waste Treatment Charge System" aimed at making manufacturers consider the full environmental impact of their products at the production stage. Under the system, manufacturers must pay non-refundable fees on "products and containers which are difficult to collect, treat, or recycle, or likely to render waste management generally difficult" to the Special Account for Environment Improvement. Products covered under the system include those made of synthetic resins, chewing gum, confectionery products, antifreeze, fluorescent lamps and batteries that fail to satisfy specific standards set for the products, disposable diapers, cigarettes, toxic substance containers, and cosmetics containers. Table 6 lists the product categories covered by the charge system and the level of fees.

Disposable Goods Restrictions

As the use of disposable goods increased in Korea, the government found that synthetic resins caused problems in waste management because they are difficult to recycle and do not decompose in landfills. To address the proliferation of disposable goods, the government restricted their distribution in the service sector, including at restaurants, stores, public baths, and lodging facilities under the 1992 Act Relating to Promotion of Resources Saving and Reutilization. Table 7 shows the regulated workplaces and items covered under the restrictions. While this program is not extended producer responsibility, per se, it may leverage manufacturers' decisions. For example, a shampoo manufacturer could switch its packaging from small individual bottles to selling its product in bulk containers.

Design Requirements for Packaging

In 1997, about 6.43 million tons of packaging material were used in the Republic of Korea for the distribution of goods. This packaging accounted for 36.8%, by volume, of the nation's municipal wastes. In order to encourage reduction of packaging waste, in 1999 the government revised its "Ordinance of the Standards for Methods and Materials, Etc. of Product Packaging." The revised ordinance restricts packaging design according to the amount of empty space inside packages and the number of packaging layers that may be used for specified products. Table 8 shows the restrictions by product category.

Table 8: Korean Packaging Restrictions by Product

Types of products	Notes	Maximum empty space ratio	Layers of packaging allowed
Groceries	Processed foods, beverages, etc.	10-20%	2
Cosmetics	Includes cleansers	10%	2
Miscellaneous goods	Toys, stationery, personal accessories	30-35%	2
Over-the-counter drugs		20%	2
Clothes	Dresses, shirts, underwear, etc.	10%	1
Gift sets	Perishables , non-perishables, cosmetics, etc.	25%	2

Source: Republic of Korea Ministry of Environment, "Efficient and Clean Resource Management: Waste Management Policy in Korea," available at http://www.moenv.go.kr/english/sub/wa_1.htm.

Eco-labeling

Like the country's disposable goods restrictions, Korea's eco-labeling program is not strictly EPR, but the program may influence manufacturers to reduce the environmental impact of their products in order to qualify for the label. The Ministry of Environment and the Korea Environmental Labeling Association (KELA) is in charge of the country's environmental labeling program. Under this program "[t]he environmental label is awarded to products, which distinguish themselves from other products serving the same purpose by reducing pollution, or by saving resource during the all phases of the life span [sic]." As of January 2001, products produced by 101 companies have been certified for the environmental label. Companies must pay an annual fee for the label, which is based on the consumer price of the labeled product.

Taiwan

Taiwan is a small but highly populated island nation (1995 est. population: 21,501,000; 13,885 square miles) which lacks available space for siting disposal facilities. Furthermore, local residents often protest the building of landfills and incineration plants. As part of its comprehensive plan to reduce disposal needs, the government has enacted EPR measures targeting many materials including packaging, batteries, automobiles, and end-of-life consumer electronics. EPR policies in place in Taiwan include deposit-return systems, mandatory product take-backs, and compulsory environmental labeling.

Under its Waste Disposal Act, the Taiwan Environmental Protection Administration (TEPA) is empowered to require manufacturers, importers and sellers to recycle and process those products that (a) are difficult to clean or process, (b) contain materials that do not decompose for a long time, or (c) contain hazardous materials. Pursuant to the Act, TEPA requires recycling of containers, used tires, used cars and motorcycles, lubricant oils, batteries, televisions, air conditioners, refrigerators, washing machines, and computers and computer accessories. The recycling requirements were introduced gradually, with the PET requirements coming into force first, in 1989, and computer printer requirements effective January 1, 2001.

Deposit-refund

In order to fulfil their obligations for PET recycling under the Waste Disposal Act, members of the PET industry created a modified deposit-refund system where manufacturers and importers paid into a fund and consumers were given a refund for returning PET bottles. The industry formed a foundation to administer the recycling fund that was meant to cover consumer refunds and collection and recycling costs for the bottles. PET manufacturers and importers were required to pay into the recycling fund according to their sales. Initially, consumers returning bottles to any of the more than 10,000 established collection locations were paid a refund of 2.00 New Taiwan dollars (NT$), or approximately US$0.06. Recycling plants paid collectors NT$0.50 per bottle for each bottle delivered. By 1992 Taiwan's PET recycling rate was 80 percent.

As recovery of PET bottles increased, payment of the refunds resulted in a deficit in the fund.

The problem was further exacerbated by free riders – PET packaging manufacturers not registered with or reporting to the Recycling Fund Management Committee. The refund value has since been reduced – first to NT$1.00 and then to NT$0.50 per bottle and the government is considering whether to eliminate the deposit altogether.[12]

The Recycling Fund Management Committee has been working to increase manufacturer's and importer's compliance with the system. From July 1998 to May 2000, the number of enterprises reporting to the Committee increased from 1,648 to 2,258. Furthermore, audits of 655 companies performed in 1999 and 2000 revealed errors and under-reporting that resulted in over 259 million NTD in unpaid fees.

Mandatory product take-backs

Recycling of non-PET containers, used tires, used cars and motorcycles, lubricant oils, batteries, televisions, air conditioners, refrigerators, washing machines, and computers and computer accessories in Taiwan is accomplished through a system of mandatory product take-backs.

As materials became subject to the recycling requirements, the relevant industries established separate recycling systems. The Waste Disposal Act, as implemented by TEPA, required all responsible businesses to join a third party recycling organization. As a result, industry

Table 9: Taiwan's Recycling Fees, effective 1999-2000

Category/Recycling targets for 2000	Designated recyclables	Fees (NT$/kg)	Fees (US¢/lb)
General Containers/55%	PET	3.01-14.01: Also NT$0.5 redemption fee per bottle	4.33-20.17: Also 0.72¢ redemption fee per bottle
	Iron	2.74-3.01	3.95-4.33
	Aluminum	1.30-1.43	1.87-2.06
	PS	Foamed: 37.29; unfoamed 9.00	Foamed: 53.70; unfoamed 12.96
	PVC	19.55	28.15
	PP/PE	9.39-10.39	13.52-14.96
	Tetra Pack	9.51	13.69
	Glass	1.31	1.89
	Paper	3.94	5.67
Specific containers/55%	Chemicals for environmental sanitation	0.83-1.55	1.20-2.23
	Pesticide containers	Processed commodity: 0.83-1.55 Virgin materials: 0.35 for every import value of US$1	Processed commodity: 1.20-2.23 Virgin materials: 1.11 for every import value of US$1
Tires/75%		Size dependent: 10-300 each	14-432
Batteries/Lead:75% ; Dry 25%	Lead	1.992/liter	2.87/liter
	Mercury	Type dependent: 2-200	3-288
	Other		
Lubricant Oils/30%		0.487/liter	0.70
Motor Vehicles/40%		Car: 983 each Motorcycle: 264 each	Car: 1416 each Motorcycle: 380 each
Appliances/40%[1]	TV	25 in or smaller: 270 (119) each Others: 420 (245) each	25 in or smaller: 389 (171) each Others: 605 (353) each
	Refrigerators	250 liters and below: 440 (157) each Others: 680 (427) each	250 liters and below: 634 (226) each Others: 979 (615) each
	Washing Machines	360 (272) each	518 (392) each
	Air/Heat Conditioners	290 (174) each	418 (251) each
Computers and accessories/70%	Notebook	90 each	130 each
	Motherboards and hard drives	67.50 each	97.20 each
	Monitor	147 each	217 each
	Printers	11 each	16 each

Notes: US$1=NT$31.50
[1]Taiwan's Recycling Fee Rate Committee raised fees for appliances effective May 1, 2000. The figures in parentheses indicate the fee level before that date.
Source: Taiwan Environmental Protection Administration and "Home Appliance Recycling Fee to be Raised;" Environmental Policy Monthly, Taiwan R.O.C.; Taiwan Environmental Protection Administration, Office of Science and Technology Advisors; Vol. III, Issue 10, April 2000.

created numerous recycling organizations that had various organizational structures and were often unregulated by the government. Sometimes industry created multiple organizations responsible for the same materials. TEPA considered this system inefficient and ineffective and in 1997 divided the materials subject to mandatory recycling requirements into eight categories and established a quasi-governmental Resource Recycling and Management Fund and management council for each category. All producers and importers were required to submit bi-monthly reports containing actual sales data for the previous two months and pay processing fees to a designated fund. In July 1998 TEPA merged all the recycling funds into a single Resource Recycling and Management Fund, overseen by a newly created Recycling Fund Management Committee. The recycling fees for each product category are shown in Table 9.

Under the current system, independent auditing groups selected by TEPA set the recycling fees annually based on material value and the recycling rate in the previous year. Funds paid into the recycling fund are used as reimbursements of industry's costs for auditing certification and recycling. The remainder of the fund is transferred to the national government.

Consumers must drop off materials subject to the take-back requirements. Supermarkets and chain stores are required to establish collection points for waste containers that bear the official recycling logo (see further details in the Eco-labeling section below). Under Taiwan's take-back system for computers, TVs, refrigerators, washing machines, and air conditioners, retailers must accept these used items from customers, regardless of when the item was sold.[13]

Taiwan is considering modifying its take-back system. TEPA has drafted the *Resource Recycling and Reuse Act,* which would replace the Waste Disposal Act. Under this proposed new law, the overall recycling system would remain similar to the current system, including fees for designated recyclables and use of a recycling fund. However, enterprises with their own take-back programs in place may choose to pursue recycling independently, and those with

Other Asian EPR initiatives

China: The national government banned, effective 2000, the use and production of white foamed polystyrene disposable food containers. ("Styrofoam ban, booming fast-food market drive demand for disposable containers" China Online http://www.chinaonline.com/industry/agriculture/NewsArchive/secure/2000/June/B100062225.asp viewed March 27, 2001.)

India: In 1999, the Indian Ministry of Environment and Forests banned the use and sale of plastic bags less than 20-microns thick. The ban has been largely ignored, spurring at least one locality, Mumbai, to pass its own ban. (The Environmental Law Reporter International Update, Environmental Law Institute, Washington, D.C., September 11, 2000, http://www.eli.org/elrinternationalna/update/9.11.00.internationalupdate.htm)

Nepal: Numerous levels of government in Nepal have joined a campaign to eliminate plastic waste. The first action was taken in 1999 when the Nepalese government banned all kinds of plastic bags and bottles in the country's Khumbu region. The municipalities of Hetauda, Dhangadhi, and Itahari all banned the use of plastic bags in 2000. The Mustang District Development Committee banned plastic bags in its high mountain region. (Source: Nepal: Plastic Bags Banned from Nepal's Regions, Imballaggi & Ambiente, Consorzio Nazionale Imballaggi, Italy, December 2000, page 12.)

The Philippines: The Philippine's new Solid Waste Management Act, signed into law in early 2001) includes a ban on disposable packaging. The National Packaging Institute will determine which materials will be banned. (The Environmental Law Reporter International Update, Environmental Law Institute, Washington, D.C., February 5, 2001, http://www.eli.org/elrinternationalna/update/9.11.00.internationalupdate.htm)

good recycling achievements may reduce or be exempt from recycling fees.[14]

Eco-labeling

Taiwan has established two environmental labeling systems; one mandatory and one voluntary. The mandatory labeling system requires all containers covered by the Waste Disposal Act to carry an official recycling symbol. The voluntary eco-label program, Green Mark, allows manufacturers to apply for the right to use the Green Mark on their product(s). Green Mark's objectives include encouraging consumers to purchase products that are deemed more "environmentally friendly" and to provide manufacturers with incentives to design and supply more environmentally friendly products.

The Green Mark Program establishes criteria that goods must meet in order to carry the label. Since the program was initiated in February 1993, more than 200 products have qualified for eco-labeling.

Resources

English text of the Law for Promotion of Sorted Collection and Recycling of Containers and Packaging (in a pdf file), Japanese Ministry of International Trade and Industry. http://www.meti.go.jp/english/information/downloadfiles/cReCont02e.pdf

English text of the Law for Recycling of Specified Kinds of Home Appliances, June 1999, Japanese Ministry of International Trade and Industry, http://www.meti.go.jp/english/special/EnvironmentalProtection/index.html

Japan Container and Package Recycling Association. Web site in Japanese (http://www. jcpra.or.jp/index.html). A free web site translator available at http://babelfish.altavista. com/ produces a rough translation.

Japan Expanded Polystyrene Recycling Association (JEPSRA)
6F Shouwaakihabara Building, 2-20 Sakuma-cho, Kanda Chiyoda-ku Tokyo 101-0025
Tel 03-3861-9046/Fax 03-3861-0096
http://www.jepsra.gr.jp/en/

Republic of Korea Ministry of Environment English web site: http://www.me.go.kr/english/newindex.html

Taiwan Environmental Protection Administration web site: http://www.epa.gov.tw/ english/

Taiwan Waste Disposal Act as revised March 28, 1997. http://www.epa.gov.tw/english/ LAWS/wasteact.htm

NIPPO Internet: Packaging & Waste Information Site http://www.nippo.co.jp/eng/efrnt.htm

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5111 Berwyn Rd. #115, College Park, MD 20740
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Web site: http://www.raymond.com/
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Contacts

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Korea Environmental Labelling Association, #1307 Leader's Bldg., 1599-11, Seocho-Dong, Seoul-Ku, Seoul, 137-070, Korea (822) 597-0124, fax (822) 597-0125, Web site: http://www.kela.or.kr

Endnotes

[1] Pat Franklin, "Extended Producer Responsibility: A Primer," Container Recycling Institute, Washington, DC, at http://www.container-recycling.org/epr.html.

[2] Akira Ueno, Japan Container and Package Recycling Association, Tokyo, Japan, "A Report on an Exercise of EPR in Japan: Elements Needed for the Sound Development of EPR," published in *OECD Joint Workshop on Extended Producer Responsibility and Waste Minimisation Policy in Support of Environmental Sustainability, Paris, 4-7 May 1999, Part 1: Extended Producer Responsibility*, March 2000, pp. 55-56. The full report is available for download at: http://www.olis.oecd.org/olis/1999doc.nsf/63c71d2d4054d0fdc125685d0053aee4/c125685f0037ebabc12568a500602b7f/$FILE/00074110.PDF.

[3] Japan reorganized its ministries effective 2001. The Ministry of International Trade and Industry (MITI) is now called the Ministry of Economy, Trade, and Industry (METI).

[4] All data for Japan is for fiscal years, with the 1997 fiscal year running from April 1, 1996 to March 31, 1997, the 1998 fiscal year extending from April 1, 1997 to March 31, 1998, and so on.

[5] John E. Gibson and Yoko Naito, "Thrown Off: Design City's new garbage disposal system has some locals left holding the bag," *Chubu Weekly*, Nagoya, Japan, Aug. 31 - Sept. 13, 2000, pg. 1.

[6] Akira Ueno, Chief Executive Director, Japan Container and Package Recycling Association, "Presenting the Formula to Calculate the Japanese Recycling Fee," at http://www.saic-epak.com/news2/table1.htm.

[7] See Akira Ueno, Chief Executive Director, Japan Container and Package Recycling Association,

"Presenting the Formula to Calculate the Japanese Recycling Fee," at http://www.saic-epak.com/news2/table1.htm for a detailed description of the fee calculation.

[8] Allied Japanese Groups Working on the Issues of Environment, March 16, 2000 message posted on the Grassroots Recycling Network's greenyes listserve. Message available at http://www.earthsystems.org/list/greenyes/jan2000/0291.html.

[9] Bette K. Fishbein, "EPR: What Does It Mean? Where Is It Headed?" *Pollution Prevention Review*, Autumn 1998, pg. 47. Also available on the INFORM web site at: http://www.informinc.org/eprarticle.htm.

[10] Naoko Tojo, "Analysis of EPR Policies and Legislation through Comparative Study Of Selected EPR Programmes for EEE - Based on the In-Depth Study of a Japanese EPR Regulation," International Institute for Industrial Environmental Economics, Lund University, Lund, Sweden; 1999. Available for download at the International Institute for Industrial Environmental Economics web site at: http://www.lu.se/IIIEE/publications/communications/2000/2000_10.pdf.

[11] Korea's 1998 GDP was $10,900 and annual per capita municipal solid waste generation was 400 kilograms.

[12] As of May 4, 2001, the TEPA web site stated, "The Solid Waste Bureau will consider totally doing away with the deposit in another six months…." This language has been posted on the site for more than six months.

[13] Beverley Thorpe and Iza Kruszewska, "Strategies To Promote Clean Production - Extended Producer Responsibility," Clean Production Action, Montreal, Quebec, January 1999. Available for download at: http://www.anped.org/PDF/5spacepr1999.pdf.

[14] "Deliberation of Draft Recycling Act Begins Anew," *Environmental Policy Monthly*, Taiwan R.O.C.; Taiwan Environmental Protection Administration, Office of Science and Technology Advisors; Vol. III, Issue 10, April 2000. Available for download at: http://www.epa.gov.tw/english/EPM/.