

EPR Case Study: Japan

January 10, 2014

The Recycling Scheme for Compact Rechargeable Batteries in Japan - under the Act on the Promotion of Effective Utilization of Resources

Author:

Dr. Tomohiro Tasaki, National Institute of Environmental Studies, Japan

Country: Japan

Contact Person: Dr. Tomohiro Tasaki, National Institute of Environmental Studies, Japan

Title of the EPR-related Legislation: Specified resources-recycled products stipulated in the Act on the Promotion of Effective Utilization of Resources

In the ministerial ordinance issued based on this act, two types of products are stipulated as “specified resources-recycled products,” for which the producers are required to promote self-collection and recycling. Therefore, the recycling scheme for these specified products introduced by the act employs the idea of extended producer responsibility (EPR).

- Compact rechargeable batteries (sealed lead acid batteries, sealed nickel-cadmium batteries, sealed nickel-metal hydride batteries, lithium batteries)
- Personal computers (including cathode-ray tubes (CRTs) and liquid crystal displays)

The recycling schemes came into force in: April 2001 (the above-mentioned act was promulgated in June 2000).

This document explains the recycling scheme for compact rechargeable batteries in Japan.

1. Legal Aspects

The Act on the Promotion of Effective Utilization of Resources and the Treatment of Specified Resources-recycled Products Stipulated in the Act

The Act on the Promotion of Effective Utilization of Resources states that, it is desirable that business operators are encouraged to conduct independent and autonomous collection and recycling activities, for products where the recycling of used resources should be encouraged and the collection and recycling by relevant business operators is possible. Therefore, the act employs the idea that business operators should design a recycling scheme for their products and implement the scheme flexibly according to various possible situations, rather than having regulatory measures which could restrict proper implementation of recycling schemes. The Act on the Promotion of

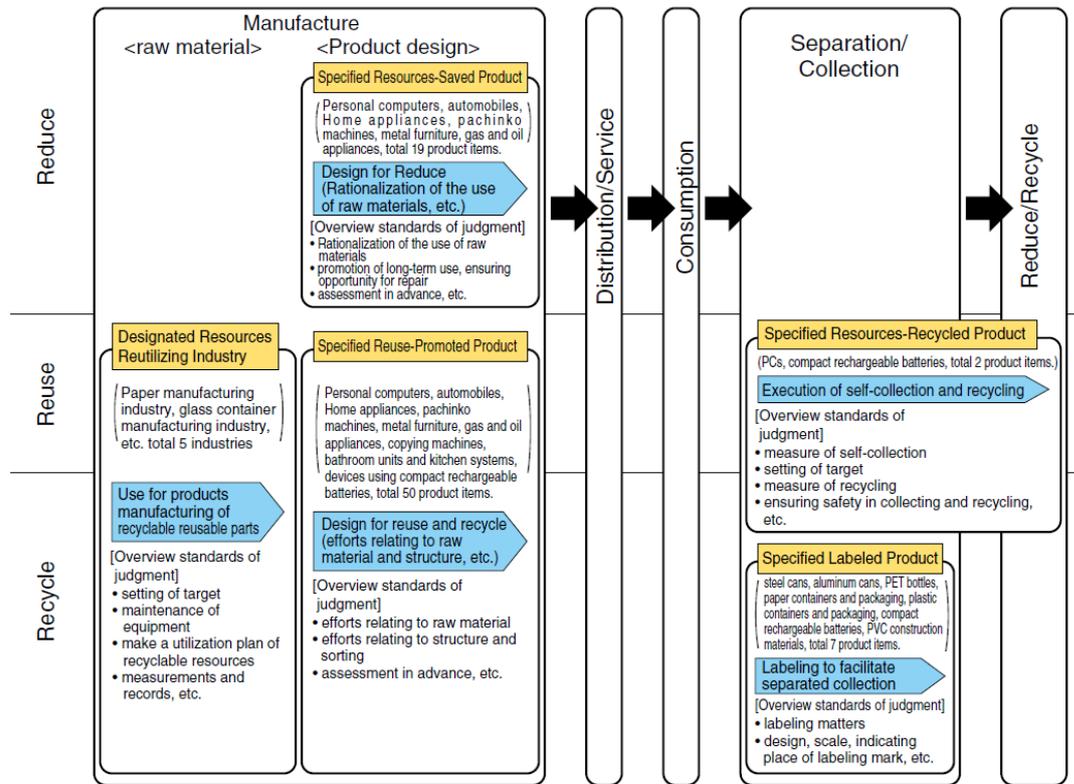
Effective Utilization of Resources specifies the products mentioned above as “specified resources-recycled products,” and promotes the recycling of these products by setting, criteria of self-collection and recycling for business operators who manufacture, process, repair or sell these products (Articles 26-33 of the law).

With regard to used compact rechargeable batteries, the “Ministerial Ordinance Stipulating the Criteria to Be Used by Sealed Battery Manufacturers, etc. and the Manufacturers, etc., of Products Using Sealed Batteries, concerning the Self-Collection and Recycling of Waste Sealed Batteries” was issued on March 28, 2001. This ordinance stipulates that, the manufacturers, etc. of the batteries (which means manufacturers or sellers who sell what they imported by themselves; hereinafter the same shall apply) and the manufacturers, etc. of products using batteries should “conduct the self-collection of waste sealed batteries by designating self-collection points, installing collection boxes, or taking other measures needed for self-collection.”, requiring self-collection of waste rechargeable batteries. The ordinance requires the manufacturers, etc. of products using batteries to hand over the waste compact rechargeable batteries that they collected to the manufacturers, etc. of batteries. The ordinance also requires that the manufacturers, etc. of batteries should recycle the waste compact rechargeable batteries that were collected.

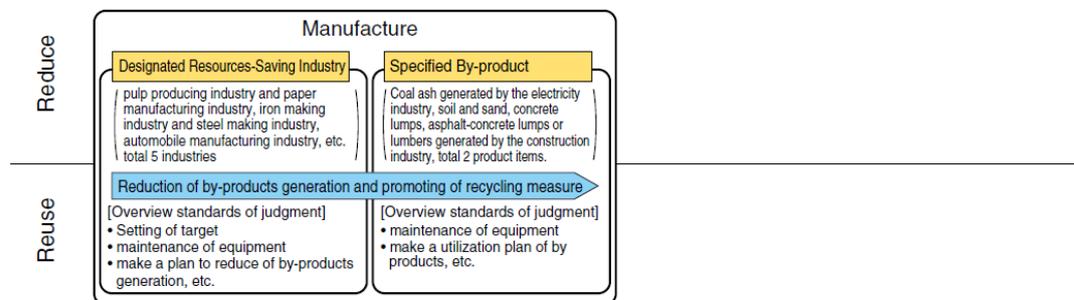
Reference: The Act on the Promotion of Effective Utilization of Resources

The Act on the Promotion of Effective Utilization of Resources aims at comprehensively promoting the reduction of waste, the reuse of parts, and the recycling of used products into raw materials. The act provides for measures to be taken by businesses, such as 3R (Reduce, Reuse, and Recycle)-related measures in the production stage, 3R consideration in the product design stage, labelling for the sorted collection, and the development of a system for self-collection and recycling by manufacturers.

I. For Products Businesses to be obligated to promote the reduction of generation of used products, to use reusable parts and recycled resources (use recycled material as raw materials)



II. For By-products Businesses to be obligated to promote the reduction of generation of by-products and recycling (use recycled resources as raw material)



Source: METI (2010), Towards a 3R-Oriented, Sustainable Society: Legislation and Trends 2010. (<http://www.meti.go.jp/policy/recycle/main/data/pamphlet/pdf/handbook2010-eng.pdf>)

Products Subject to the Recycling Scheme

Batteries subject to the recycling scheme are as follows: compact rechargeable batteries (sealed batteries) including nickel-cadmium batteries, nickel-metal hydride batteries, lithium batteries (except for batteries used for memory retention in machinery); and small sealed lead acid batteries (limited to batteries with an electrical charge of 234 kC or less). Non-rechargeable batteries and automobile storage batteries are not subject to the law (non-rechargeable batteries are collected and recycled by local governments. Automobile storage batteries are collected and recycled by business operators and their collection and recycling are not regulated by the act).

The above-mentioned compact rechargeable batteries became subject to the act because they met the following criteria.

1) Technical and economic standpoints:

- a) The technology to recycle the product exists and that technology is available.
- b) The establishment of a system for the self-collection and recycling of the product is economically feasible, for example business operators can pay some of the costs for self-collection and recycling.

2) The need for policy measures:

- a) The collection and recycling of the product cannot be fully achieved through the voluntary efforts of business operators alone.
- b) Recycling of the product by municipalities is difficult because it requires advanced technologies.

Collection Schemes

There are three main schemes for the collection of compact rechargeable batteries in Japan, as shown in Table 1. The major scheme is the collection scheme conducted by the Japan Portable Rechargeable Battery Recycling Center (JBRC), which is a producer responsibility organization (PRO). The JBRC collects the majority of the three types of compact rechargeable batteries and a small amount of small sealed lead acid batteries. In addition, Lithium-ion batteries used in cell phones are collected and recycled through the Mobile Recycle Network, which is another PRO, and in this case, the recycling is conducted by each communications service provider (carrier), although the collection is conducted collectively. Most sealed lead acid batteries are collected by individual battery manufacturers, etc.

Table 1 The Schemes for the Collection of Compact Rechargeable Batteries in Japan

	NiCd	NiMH	Li-ion	Lead-acid
JBRC	X	X	X	Very small amount
Mobile Recycle Network			X	
Individual manufacturers, etc. of sealed lead acid batteries				X

The outline of the collection and recycling scheme of the JBRC is shown in Fig.1.

Retailers, etc. that sell compact rechargeable batteries and products using compact rechargeable batteries register with the JBRC as cooperation shops for recycling. Collection boxes for waste compact rechargeable battery (Fig. 2) are installed in cooperation shops for recycling. When the collection boxes are filled with waste rechargeable batteries (about 7-8 kg), cooperation shops for recycling ask the JBRC to pick up the waste batteries. This route is a route for collecting waste batteries from consumers. In line with this route, waste commercial rechargeable batteries are collected by cooperation businesses for recycling. Generators of commercial waste rechargeable batteries include: construction businesses that replace rechargeable batteries, business that sell rechargeable batteries, and businesses that use large quantities of rechargeable batteries. Cooperation businesses for recycling register with the JBRC, and when they have collected about 20 kg of waste rechargeable batteries, they ask the JBRC to collect them. Unlike cooperation shops for recycling, cooperation businesses for recycling have to sort the batteries by type. Municipalities can register with the JBRC similarly to cooperation businesses for recycling, but compared with cooperation shops, not many municipalities have registered because they would need to sort the collected batteries by type if they have registered.

Rechargeable batteries are collected and transported to recyclers by the delivery businesses outsourced by the JBRC. When the JBRC receives a report that waste rechargeable batteries have been handed over to recyclers, the JBRC pays contract fees to the collection and transportation businesses. Waste rechargeable batteries handed over to recyclers are sorted manually, before they go through different types of processing for the different types of batteries including dismantling, sorting, and heat treatment, in order to turn them into recyclable resources.

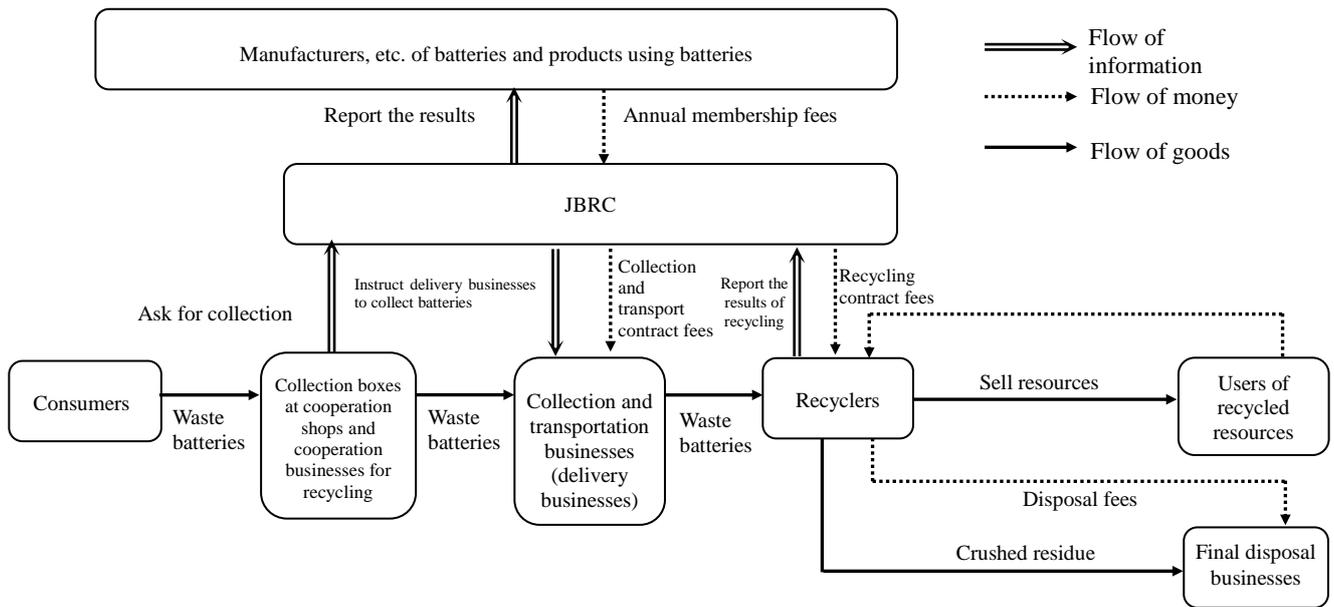


Fig. 1 The JBRC Scheme for the Collection and Recycling of Waste Compact Rechargeable Batteries



Fig. 2 JBRC's Collection Boxes for Waste Compact Rechargeable Batteries

Reference: The Scheme for the Collection and Recycling by the Mobile Recycle Network

Compact rechargeable batteries used in cell phones (lithium-ion batteries) are collected at retailers which sell cell phones. This take-back system is for the following three items: cell phones, battery chargers, and rechargeable batteries. In order to protect private information in a cell phone, the data is destroyed physically destroying the memory component of the cell phone (by punching at least two holes in it) when a cell phone is collected through the scheme.

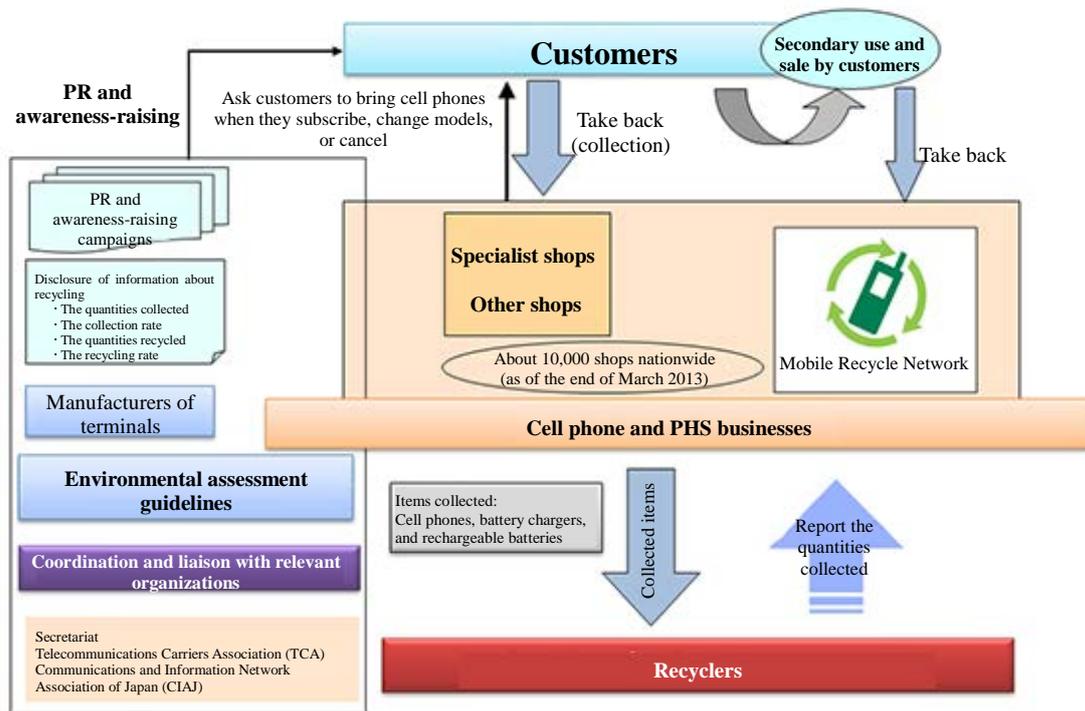


Figure The Scheme for the Collection and Recycling of Waste Compact Rechargeable Batteries by the Mobile Recycle Network (<http://www.mobile-recycle.net/flow/>)

Roles and responsibilities

Stakeholders for the scheme consist of battery manufacturers, etc. and the manufacturers, etc. of products using batteries, as well as retailers (shops cooperating for recycling), municipalities, household generators (general consumers), commercial generators (businesses cooperating for recycling), and the national government. Their roles in the scheme are shown below.

1) Battery Manufacturers, etc.

As explained above, battery manufacturers and the like (importers of compact rechargeable batteries are included. Hereinafter, referred to simply as “battery manufacturers”) are required to collect and recycle waste compact rechargeable batteries, which are designated as “specified resources-recycled

products” under the Act on the Promotion of Effective Utilization of Resources. Each fiscal year they are also required to disclose information about the collection and recycling that they conducted. A business operator who is to conduct these activities can ask to be certified by the competent minister. The certified business operator is given due consideration when regulations are applied based on the Waste Management and Public Cleansing Act, and also the government coordinates with the Japan Fair Trade Commission, so that the certified business operator can smoothly conduct the collection and recycling of the waste batteries.

When a municipality, which is responsible for the disposal of municipal solid waste (MSW), requests the battery manufacturers to receive waste compact rechargeable batteries that the municipality has collected, the manufacturers must accept the batteries from the municipality. However, the battery manufacturers can stipulate their conditions for accepting the waste batteries from municipalities beforehand, and if the waste batteries collected do not meet the conditions, the manufacturers do not have to accept the batteries. Compact rechargeable batteries are designated as “specified labeled products” under the Act on the Promotion of Effective Utilization of Resources. This means that the manufacturers, etc. of compact rechargeable batteries must label rechargeable batteries in order to help in the sorting process. The labels used are shown in Fig. 3. The roles of battery manufacturers, etc. under that act are summarized in Table 2.

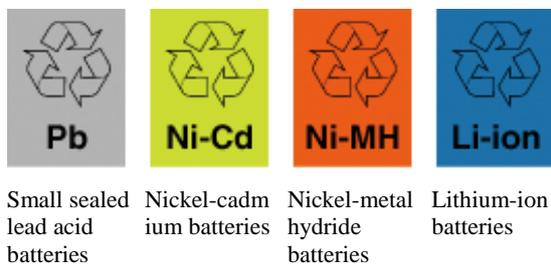


Fig. 3 Labels Used for Compact Rechargeable Batteries in Japan

Table 2 The Roles of Battery Manufacturers, etc. and the Manufacturers, etc. of Products Using Batteries in the Collection and Recycling of Compact Rechargeable Batteries

Obligations		Stakeholders	
		Battery manufacturers, etc.	Manufacturers, etc. of products using batteries
Collection of waste rechargeable batteries	Specified resources-recycled products	X	X
Recycling of waste rechargeable batteries		X	
Provision of information		X	X
Cooperation with municipal governments with regard to collection		X	
Labelling of rechargeable batteries	Specified labeled products	X	
Equipment design which makes it easy to remove rechargeable batteries	Specified reuse-promoted products		X

2) Manufacturers, etc. of Products Using Batteries

Manufacturers, etc. of products using batteries are required to collect waste compact rechargeable batteries and hand them over to the battery manufacturers. Each fiscal year they are also required to disclose information about the collection and handing over activities. Similarly to the battery manufacturers, the manufacturers, etc. of products using batteries who will conduct these activities can ask to be certified by the competent minister. Products using compact rechargeable batteries are designated as “specified reuse-promoted products” under the Act on the Promotion of Effective Utilization of Resources. This means that the manufacturers of compact rechargeable batteries are required to use designs which make it easy to remove compact rechargeable batteries from equipment which contains compact rechargeable batteries.

3) Retailers (Shops Cooperating for Recycling)

Retailers are not required to collect and recycle waste compact rechargeable batteries, but they are expected to cooperate with manufacturers, etc. in the collection of rechargeable batteries from consumers, as shops cooperating for recycling. The ministerial ordinance based on the Act on the Promotion of Effective Utilization of Resources stipulates that, the battery manufacturers and the manufacturers, etc. of products using batteries can ask for necessary cooperation from business operators who process, repair or sell compact rechargeable batteries and products using compact rechargeable batteries.

4) Municipalities

Article 9 of the act states: “Local governments shall endeavor to promote Effective Utilization of Resources according to various socioeconomic conditions in their areas.” However, there is no provision which stipulates the specific roles of local governments. There are only a small number of municipalities which cooperate with retailers in the collection of compact rechargeable batteries under the scheme.

5) Household (Consumers)

The act stipulates the responsibility of consumers as follows: consumers shall endeavor to use products for as long as possible and promote the utilization of recyclable resources and reusable parts, and shall also cooperate with the state, local governments, and business operators (Article 5). Consumers are expected to cooperate with business operators, etc. in the collection and recycling activities under the scheme.

6) Commercial facilities (Businesses Cooperating for Recycling)

Commercial facilities which discharges waste compact rechargeable batteries are not required to collect and recycle batteries, but they are expected to cooperate with manufacturers, etc. in the collection of batteries as businesses cooperating for recycling.

7) National Government (the Competent Ministers, Ministries and Agencies)

The Ministry of Economy, Trade and Industry (METI) and the Ministry of the Environment (MOE) are in charge of the scheme. The act states, “The State shall, through educational and publicity activities, endeavor to increase public understanding regarding the promotion of the Effective Utilization of Resources and to ask for public cooperation concerning the implementation of such activities” (Article 8). Therefore, in addition to being responsible for supervising the scheme, the METI and the MOE are also expected to conduct educational and awareness-raising activities on compact rechargeable batteries.

Payment of Costs

The ministerial ordinance based on the act states that manufacturers conduct the self-collection of waste batteries without receiving compensation. Practically, the collection of waste batteries is conducted free of charge. In the case of the JBRC, manufacturers of rechargeable batteries and products using batteries pay annual membership fees to the JBRC. The JBRC uses this fund to collect waste rechargeable batteries free of charge, from collection boxes at cooperation shops for recycling as well as from cooperation businesses for recycling, etc. The JBRC then outsources the recycling of the collected waste batteries. The annual membership fee is proportional to the quantity

of batteries produced and sold, and the unit cost of collection and recycling is set for each type of battery.

Targets Set by the Act

The target recycling rates shown in Table 3 are set under the act. The recycling rate is defined as the percentage of the total weight of materials recycled from waste compact rechargeable batteries, that were turned into a recyclable state, out of the total weight of waste compact rechargeable batteries collected. Recycling means that waste compact rechargeable batteries are turned into iron, lead, nickel, cobalt, cadmium and other recyclable resources so as to be used. Recycling does not include energy recovery.

Table 3 Target Recycling Rates for Waste Compact Rechargeable Batteries in Japan

	Target recycling rate
Sealed nickel-cadmium batteries	60%
Sealed nickel-metal hydride batteries	55%
Sealed lead acid batteries	50%
Lithium batteries	30%

2. Governance Aspects

Monitoring for the Scheme

The ministerial ordinance based on the act requires that, battery manufacturers and the manufacturers, etc. of products using batteries must disclose information every fiscal year about the self-collection and recycling of waste sealed batteries that they conducted individually or collectively. The METI and the MOE aggregate the data disclosed by the manufacturers, etc. and publish the collection and recycling results.

<http://www.meti.go.jp/policy/recycle/main/data/statistics/pdf/pcbattery.pdf>

<http://www.env.go.jp/recycle/recycling/recyclable/jokyo.html>

The ministers responsible for the scheme are the Minister of Economy, Trade and Industry and the Minister of the Environment. The act stipulates, “The competent minister may, when he/she finds this necessary in order to promote the self-collection and recycling of waste specified resources-recycled products, provide specified resources-recycling business operators with the necessary guidance and advice with regard to the self-collection and recycling of used specified resources-recycled products, by taking into consideration the standards of judgment prescribed in Article 26, paragraph 1” (Article 32 of the act). When the ministers deem that the self-collection and recycling achievements by a producer (who sells two million pieces of equipment or more) fall far short of the “standards of judgment” (criteria) stipulated in Article 26, paragraph 1, the ministers

may recommend that the producer should take the necessary measures (Article 33). When the producer fails to follow the recommendations, the ministers may disclose this (Article 33, paragraph 2). If the producer still fails to follow the recommendations, the ministers may order the producer to take necessary measures, after hearing the opinions of the government advisory councils (Article 33, paragraph 3). The Industrial Structure Council at the METI and the Central Environment Council at the MOE have been designated as the above-mentioned government advisory councils.

This scheme is based on the idea of encouraging voluntary efforts of business operators. The governance of collection and recycling activities are based on information exchanges between business operators and the government.

Penalties

Those who fail to follow the ministers' order to take necessary measures stipulated in Article 33, paragraph 3 of the act mentioned above are punished with a fine of not more than 500,000 yen.

Monitoring of the Collection System by Producers

Delivery tickets are used to manage information in the collection system of waste rechargeable batteries. Duplicates of delivery tickets are kept by those who cooperate with manufacturers in the recycling of waste batteries (cooperation shops for recycling, cooperation businesses for recycling, or cooperation municipalities for recycling), collection and transportation businesses (delivery businesses), and recyclers, so that the JBRC can monitor the delivery of waste batteries from cooperation shops/businesses/municipalities for recycling to those who receive and recycle the waste batteries. Cooperation shops/businesses/municipalities can check the time and date when they handed over the collected rechargeable batteries, as well as the type and the weight of the batteries online. When the JBRC receives the information that waste rechargeable batteries have been handed over to recyclers, the JBRC pays contract fees to the collection and transportation businesses. This system gives incentives to collection and transportation businesses to ensure that the collected waste batteries are delivered to recyclers.

Audit of Recyclers by Producers

When battery manufacturers outsource recycling to other business operators, the battery manufacturers must obtain reports from the contractors on the relevant recycling businesses (an obligation stipulated in the ministerial ordinance based on the act). For example, the JBRC outsources recycling to two recyclers in Japan, and it audits these recyclers.

Stakeholder Analysis

Producers and PROs

The JBRC, a PRO, has 306 member manufacturers, etc. as of the fiscal year (FY) 2013. All 10 battery manufacturers have joined the JBRC. There are numerous manufacturers of products using batteries, and many of which have not joined the JBRC but major manufacturers join. A small portion of these businesses conduct self-collection individually.

Retailers (Cooperation Shops for recycling)

Retailers are not required to cooperate with manufacturers for collection and recycling in the scheme, but there are currently 21,102 cooperation shops for recycling (as of 2013). There are 1,719 municipalities in Japan (as of 2013), and therefore there are an average of about 12 retailer's collection points in each municipality.

Municipalities

The JBRC only accepts waste compact rechargeable batteries from municipalities if they sort the batteries into type and insulate each battery. There are 222 cooperation municipalities for recycling (as of 2013). This number includes municipalities that stopped collection cooperation activities after registering. 72 municipalities actually collected batteries in FY 2012. In the current scheme, municipalities must find financial resources to cover the cost of collecting, sorting, and insulating batteries, and there is a lack of incentives for municipalities to cooperate in the scheme.

Consumers

According to a questionnaire survey of consumers conducted by the MOE (2008), 54.6% of the respondents said that they did not know that waste compact rechargeable batteries are collected at retailers. 17.7% of the respondents said that they had never used the collection system although they knew that waste compact rechargeable batteries were collected at retailers. 13.1% of the respondents said that they did not know about the JBRC's collection system, but they had handed over waste compact rechargeable batteries to retailers. 9.2% of the respondents said that they knew about the JBRC's collection system for waste compact rechargeable batteries, but they had never used it. 5.4% of the respondents said that they knew about the JBRC's collection system and they had actually used the system at retailers. More awareness-raising about the system is needed.

Commercial Emitters (Cooperation Businesses for recycling)

Currently, there are 11,732 cooperation businesses for recycling (as of 2013).

3. Environmental Effects and Performance

Collection and Take-back

Fig. 4 shows the amount of the collection of waste compact rechargeable batteries under the Act on the Promotion of Effective Utilization of Resources.

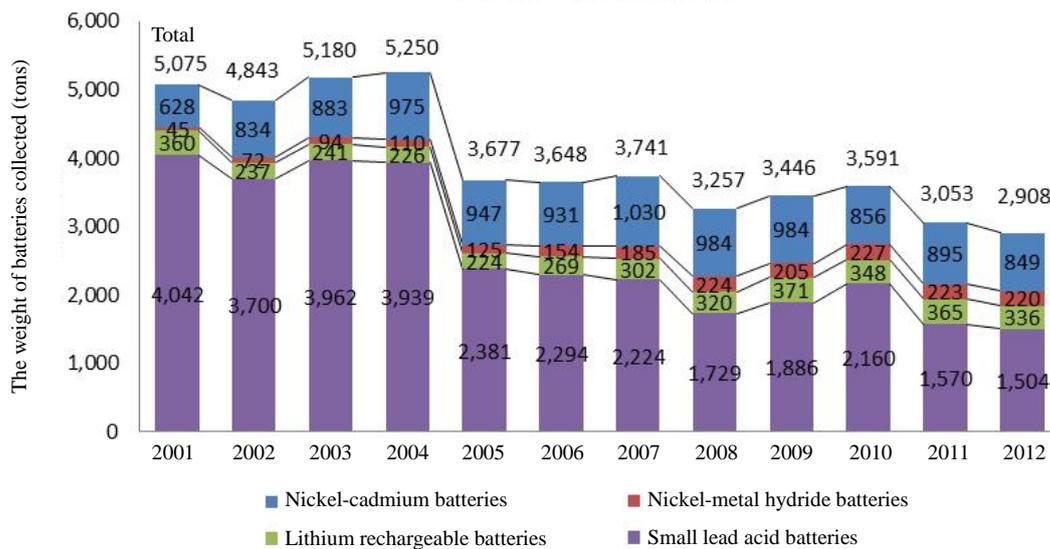


Fig. 4 Waste Compact Rechargeable Batteries Collected in Japan

The Disclosure of the Self-collection and Recycling of Batteries by Business Operators, etc. Based on the Act on the Promotion of Effective Utilization of Resources (the Results in FY 2011)

<http://www.meti.go.jp/policy/recycle/main/data/statistics/pdf/pcbattery.pdf>

Recycling

Fig. 5 shows the results of recycling waste compact rechargeable batteries based on the act. The targets set by the act have been achieved. The recycling rate for lithium-ion batteries has increased over time. The recycling rates for the other types of batteries mostly remain unchanged.

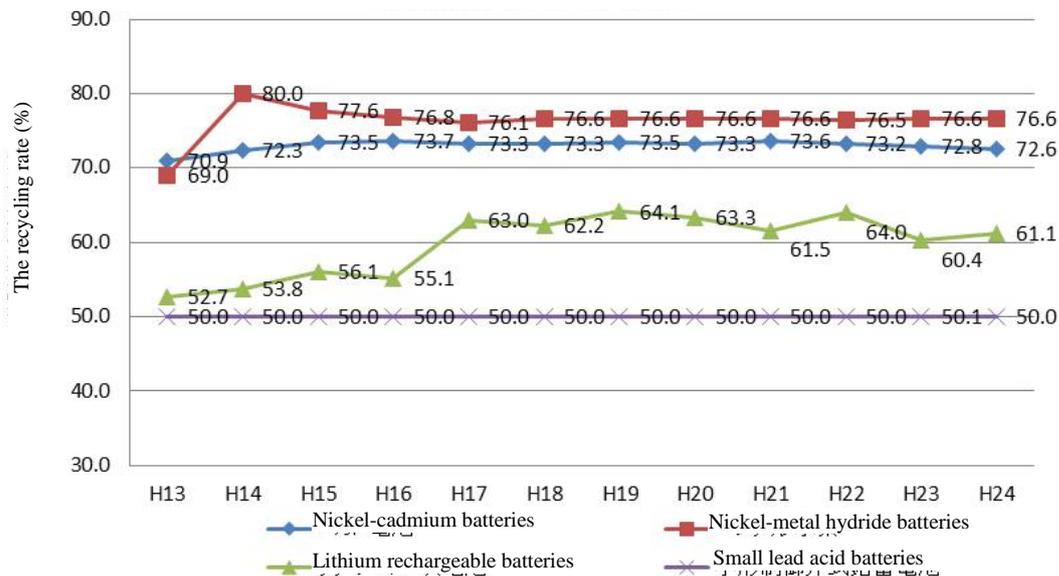


Fig. 5 Recycling Rates of Waste Compact Rechargeable Batteries in Japan

Encouraging Design for the Environment (DfE) and Removal of Batteries from Waste Products

Under the scheme, it was expected to encourage product designs which enable easy removal of compact rechargeable batteries from waste products, but there have hardly been any remarkable improvements in such product designs. “Current Status of Disposal and Recycling of Small Used Batteries in Japan” (Asari, et al., 2011) looked into the current situation regarding the removal of batteries from waste products, and confirmed that there were products from which batteries could not be removed and also products which required tools to remove batteries. Table 4 shows the current situation regarding the removal of rechargeable batteries from used products, surveyed by the MOE (2008). The percentages of respondents who removed batteries from waste products vary (in the range between 10% and 42%) depending on the item, but on average, about one-quarter of the consumers said that they removed batteries from waste products.

Table 4 Percentage of Consumers Who Removed Rechargeable Batteries from Waste Products (based on an Online Questionnaire Survey in 2007)

	n	Percentage replied	
		Discarded the product with the rechargeable battery in it	Discarded the product after removing the rechargeable battery from it
Cell phones	439	86.1	13.9
Laptop computers	221	90	10
Shavers	181	74.6	25.4
Headphone stereos (tape, CD, MD and MP3 players, etc.)	160	66.9	33.1
Electric toothbrushes	138	67.4	32.6
Digital cameras	129	79.8	20.2
Facsimiles equipped with cordless handy scanners	108	85.2	14.8
Cordless telephones	86	73.3	26.7
Handy vacuum cleaners	74	67.6	32.4
Video cameras	59	81.4	18.6
Radio-controlled model cars	52	57.7	42.3
Word processors	47	89.4	10.6
Electric tools (electric drivers, drills, etc.)	33	66.7	33.3
Blood pressure gauges	30	83.3	16.7
Personal digital assistants (PDAs)	26	76.9	23.1
Electric massagers	21	81	19
Transceivers (radios)	15	66.7	33.3
Electric power units (such as uninterruptible power supply systems (UPS))	15	73.3	26.7
Portable liquid crystal TVs	14	85.7	14.3
Portable printers	12	75	25
Average		76.4	23.6

* The average was calculated for items which had 10 or more responses, which were taken from: MOE (2008), Section 6-2 "Trends in the Disposal of PC-related Equipment and Products Using Rechargeable Batteries," *The Report on the FY 2007 Study for the Examination of Promoting Systematization and Advancement of Recycling Systems*, pp. 6-55.

Consideration of Safety

Residual power in waste rechargeable batteries creates a risk of ignition, etc. Therefore, the JBRC asks consumers to insulate batteries before they discard of waste batteries (Fig. 6). The JBRC requests cooperation businesses for recycling to insulate batteries, as well as asking cooperation shops for recycling to insulate batteries as much as possible, if consumers leave uninsulated batteries in collection boxes.



Fig. 6 Explanations of Insulation Treatment for Waste Rechargeable Batteries

Source: JBRC (2012), The Handbook for the Safe Collection of Compact Rechargeable Batteries

4. Scope and Quality of Collecting Waste Batteries

It is difficult to estimate the collection rate of compact rechargeable batteries because they are collected a few years after they have been put on the market. The collection rate was once provided at the investigative commission meetings before the act was enacted.

Asari, et al. (2011) estimated that the recent collection rate for waste compact batteries in Japan was 26%. They also discovered that the quantities of nickel-metal hydride batteries and lithium-ion batteries collected were low, as shown in the table below.

Table 5 Estimated Collection Rates for Waste Compact Batteries in Japan

Type of battery		Quantity collected (tons/year)	Collection rate (%)
Non-rechargeable batteries (cylindrical)		21,500	30
Non-rechargeable batteries (button shaped)		1	0.1
Rechargeable batteries (compact)	Nickel-cadmium batteries	984	46
	Nickel-metal hydride batteries	205	2
	Lithium-ion batteries	165	6
	Total	1,354	9

Source: Asari, M. et al. (2011), Current Status of Disposal and Recycling of Small Used Batteries in Japan. *Journal of Material Cycles and Waste Management*, 22 (6), pp. 412-425.

Note: The quantity of lithium-ion batteries shown above does not include the 191 tons of lithium-ion batteries collected by the Mobile Recycle Network. The collection rate is 13% when the 191 tons are included.

According to a survey conducted by the MOE (2008), 216 responses regarding the destination of waste cylindrical compact rechargeable batteries, which were not in battery pack form, were as shown in Fig. 7. The results of this survey showed that the largest number of respondents said that they discarded of waste batteries to municipalities (47.7%). The second largest number of respondents said that they placed waste batteries in collection boxes at retailers (25.0%) (i.e. they used the collection system of an EPR scheme). There were also cases where the batteries were mixed with other types of waste. It is necessary to increase the percentage of batteries which are collected through appropriate paths.

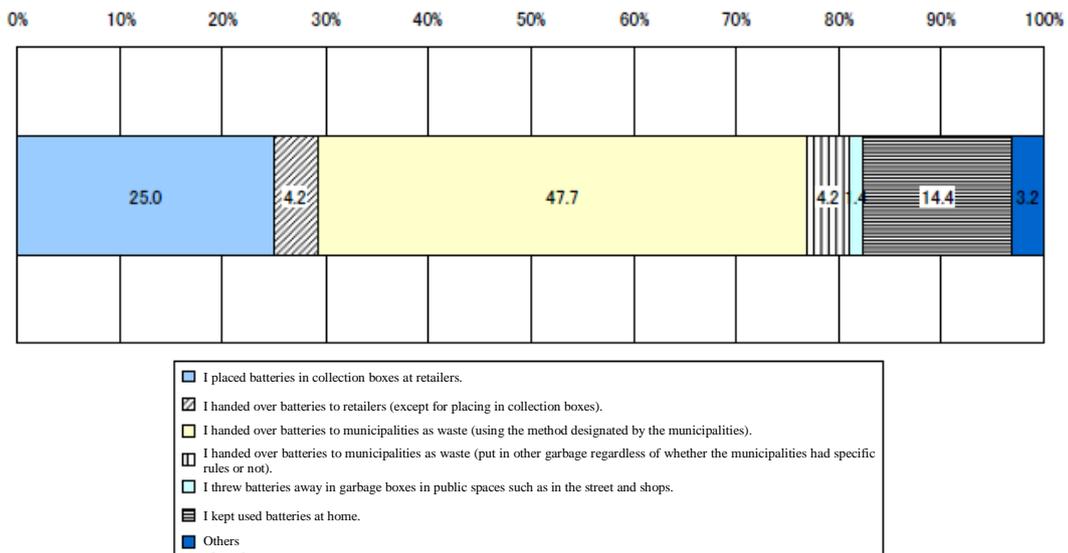


Fig. 7 Places Where Consumers Discarded of Waste Rechargeable Batteries (n=216)

Source: MOE (2008), Section 6-2 “Trends in the Disposal of PC-related Equipment and Products Which Use Rechargeable Batteries,” *The Report on the FY 2007 Study for the Examination of Promoting Systematization and Advancement of Recycling Systems*, pp. 6-58.

Quality of Collected Batteries

When waste rechargeable batteries have been handed over to recyclers contracted with the JBRC are mixed with impurities, or when waste battery packs have cracks, the recyclers return the problematic batch or battery packs to the sender, or the JBRC warn the sender to improve the quality of collected batteries. Thanks to these measures, such problems are seldom seen in waste batteries sent by cooperation businesses for recycling. However, these problems are sometimes seen in waste batteries brought in by consumers and collected in collection boxes installed at cooperation shops for recycling. Nonetheless, the occurrence of these problems has been decreasing thanks to steady awareness-raising and guidance activities.

Use of Hazardous Substances and Measures to Control Harm

The domestic shipping volume of nickel-cadmium batteries is in a decreasing trend. In Japan, efforts to reduce the use of mercury in batteries accelerated dramatically in the first half of the 1990s. Currently, mercury content in non-rechargeable batteries is zero.

Some incidents of lithium-ion battery ignition have been reported in Japan as well, and the industry tries to avoid such risk as explained with Fig. 6.

5. Cost-benefit Aspects

With regard to the costs, the JBRC discloses a balance sheet based on the obligation to report its performance, as stipulated in the act. However, the information about individual costs is not disclosed and therefore it is not possible to conduct a cost-benefit analysis.

6. Competition and Market Barriers

No competition-related problems have been pointed out. The act stipulates that, when a PRO for specified resources-recycled products is to be created, the competent minister may ask for the opinions of the Japan Fair Trade Commission regarding measures for the self-collection and recycling of the products, when necessary (Article 30).

7. Conclusion

The collection and recycling scheme for waste rechargeable batteries in Japan under the Act on the Promotion of Effective Utilization of Resources applies the idea of EPR. It has less regulatory characteristics and rather aims at autonomous implementation by producers. The scheme is working well as the target recycling rates have already been met. However, in recent years, the total weight of waste small sealed lead acid batteries collected is decreasing, and that of other batteries is rather unchanged. The main causes for the trends may be that the use of smaller and lighter batteries with

high energy density is increasing, and/or that there are only a few incentives for the stakeholders other than for producers to take part in the collection of waste rechargeable batteries. With regard to ensuring safety concerning the collection of waste rechargeable batteries, detailed measures have been taken, including the PRO of the scheme preparing detailed and specific manuals.

In light of the expected increase in the use of electric vehicles and household storage batteries, sooner or later it will be necessary to examine how the scheme should be developed with a possible option of inclusion of these batteries, from a medium- to long-term perspective.