Japan's Experiences in Waste Management Policy

- Japan’s National Policy and Kawasaki City’s Efforts -

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Chapter 1: Introduction

Rapid increases in waste generation, coupled with a greater complexity in the composition of waste including hazardous waste, pose major threats to both human health and the environment. Moreover, increasing amounts of waste also mean greater amounts of resources being wasted, while the rapid increase in waste generation and the complex composition of waste including hazardous waste result in greater pressure on local and national governments to allocate more funds to waste management.

While this is a difficult area for all countries to address, most local and national governments in developing countries have limited resources and are faced with numerous competing needs, including in the areas of health, water, education, transportation, housing and food.

Many developed countries including Japan faced a similar challenge during the 1950s and 1960s, when they experienced rapid industrialization, especially in heavy industry, while undergoing economic recovery after World War II. These countries spent many years improving their waste management through legislative frameworks, techniques and technologies, voluntary measures, awareness and stakeholder participation. Lessons from their experiences can assist developing countries in shifting their learning curve for improving waste management. The inverted U of an "environmental Kuznets curve" that relates environmental protection with income per capita can be pushed down to achieve environmental protection at less income per capita by learning and employing practices—both policies and techniques—from other countries. The notion of "develop first and clean up later" has proven to be unsound as human health was affected and many natural resources were damaged beyond quick repair, resulting in major personal, environmental and economic losses. The experience of developed countries clearly shows that the notions of cleaner production and sustainable consumption and production are key for achieving a sustainable development agenda. These notions can be realized within a shorter time span through the effective transfer of knowledge in the North-South and South-South cooperation contexts.

This brief report has been prepared by the Kawasaki City Government in close cooperation with the Ministry of the Environment of Japan, the International Environmental Technology Centre (IETC) of the United Nations Environment Programme (UN Environment) and the Institute for Global Environmental Strategies (IGES). It aims to assist developing countries in learning from the experiences of national and local governments in Japan regarding waste management.

The report is structured into four chapters. Chapter 2 provides the background of Japan during the 1950s, highlighting similarities to many developing countries' current situation. Chapter 2 also overviews improvements in national and local policies to tackle the enormous challenge of waste at that time, including hazardous waste. Chapter 3 looks at the implementation and enforcement of specific policies, as many developing countries, even those with good legislative frameworks, still face the challenge of effectively implementing and enforcing policies. This chapter covers important areas of waste management, including wastewater, gaseous emissions, containers and packaging waste, waste plastics, food waste, e-waste, construction waste, and end-of-life vehicles. Chapter 4 summarizes the lessons learned in the context of knowledge transfer opportunities for developing countries as they address the growing challenge of waste management.

Chapter 2: Overview of improvements to national & local policies in Japan

2.1 The history of waste management in Japan (1950s to 2000s)

1) Waste management as a sanitary issue and Japan's high economic growth period

From the mid-1950s through the 1970s, Japan experienced rapid economic growth and urbanization, resulting in a tremendous and ongoing increase in household waste generation, with the exception of the 1973 “oil shock” period. This was because higher household incomes, coupled with the era of television, stimulated consumption in households aiming for a more urban lifestyle. In the 1960s, 40% of municipal waste was disposed of in unlined landfills or dumped in mountainous areas (Ministry of the Environment of Japan, 2006). The burying of untreated waste in Japan, with its high-temperature, high-humidity climate, led to greater amounts of flies and mosquitoes, giving rise to a sanitary issue. Meanwhile, ensuring adequate landfill capacity became a critical issue, as Japan’s land space is limited. According to the Ministry of the Environment of Japan (2006), the amount of municipal waste generated per person per day increased roughly 6% per year during the 1960s. Lifestyle changes during that period brought dramatic increases in the amount of difficult- to-treat waste such as end-of-life household appliances and plastics. To respond to these challenges of increasing waste volumes and associated sanitary problems, Japan began promoting incineration as a primary waste treatment technology in a highly systematic and comprehensive manner.

At the same time, waste from industrial sources and associated pollution became matters of major public concern during this period. The year 1970 was an epoch-making year for Japanese environmental policy. That year, the National Diet, popularly referred to as the “Pollution Diet,” passed 14 laws promoting environmental protection. One of these was the Waste Management and Public Cleansing Law, which entered into force in 1971, replacing the Public Cleansing Act of 1954. The newly introduced Waste Management and Public Cleansing Law clearly stated that one of the objectives of waste management is environmental protection. It defined general waste (municipal solid waste) and industrial waste and clearly assigned to businesses the responsibility of managing and treating industrial waste. It should be noted that even though the Environment Agency came into being in 1971, waste management at the time was the responsibility of the Ministry of Health and Welfare. Alongside these legal developments, the Japanese national government provided support for setting up treatment facilities. For municipal waste, the national government provided subsidies to establish treatment facilities. For industrial waste, low-interest financing and special tax measures were provided to industrial sectors for establishing treatment facilities.

Also, some municipalities started to promote recycling, especially of packaging and containers, to reduce the amount of waste being landfilled.

2) The bubble economy and the waste management crisis (1980s to 1990s)

In the 1980s, Japan experienced what has often been called a “bubble economy,” characterized by intensified consumption, greater amounts of throw-away products due to changes in lifestyle and rapid urbanization. This resulted in a further increase in waste generation volumes and varieties, an insufficient number of waste disposal facilities and sites, worsening air and water quality and increasing numbers and amounts of chemical components in products. Especially, in the 1980s, the use of plastic packaging expanded, intensifying municipalities’ concerns over waste management and recycling.

In the early 1990s, Japan’s waste treatment was dependent largely upon incineration. Its incineration rate was 74%, a level much higher than that of other OECD countries, such as 55% for Sweden in 1991, 25% for Germany in 1993, 23% for the Netherlands in 1993, 16% for the US in 1993 and 5% for Canada in 1992. Another characteristic of Japan’s waste treatment system at the time was the large number of small-scale incineration facilities. Japan had 1,854 incineration facilities in 1993. This was about 10 to 100 times as many as other OECD countries. The US had 148 such

facilities; Germany, 54; Sweden, 21; Canada, 17; and the Netherlands, 11.

However, increasing waste volume and changing types of wastes posed challenges for waste management depending on both incineration and recycling activities. Firstly, the increase in plastic waste made it difficult to separate various types of plastics from other household wastes. Since incineration has been the major treatment method of household waste in Japan, Japan's small- scale incineration plants became sources of concern for pollution by dioxins. Citizens' concerns over dioxin pollution became social concerns over incinerators in the early 1990s. The 1998 White Paper of Japan's Ministry of Health and Welfare stated that 80-90% of dioxin generated in Japan resulted from incineration. Not all plastics that are burnable are suitable for incineration. Secondly, the growing number of local governments engaged in recycling resulted in an over- supply of recyclables to the market and a slump in the price of recyclables. This made the recycling market for used packaging and containers often dysfunctional, as recyclables often commanded negative prices (meaning that recyclables shifted from being valuables to a kind of social cost). This resulted in the recycling efforts of municipalities often facing difficulties when accepting recycling industries for collected recyclables.

Japan introduced two measures to respond to these challenges. Firstly, Japanese local governments decided to shut down small- scale incineration facilities and upgrade to large-scale facilities for mass incineration. To operate these large-scale incinerators, Japanese municipalities had to collect waste continually at a mass scale. At the same time, the rebuilding of old facilities into new and larger facilities, along with their running/operating costs, became very expensive. Secondly, the national government decided to introduce a series of product- specific recycling laws based on the concept of Extended Producer Responsibility (EPR).

3) Towards the establishment of a sound material-cycle society for social and economic reform (late 1990s to early 2000s)

In the 1990s Japanese society faced fundamental changes. First, during the long structural recession of the 1990s, there arose the realization of the need to restructure Japanese society. With the end of the Cold War and a deceleration of the economy, an atmosphere arose from the 1990s that Japan's political, economic and social structures needed to be restructured through structural reform. For example, Prime Minister Junichiro Koizumi (in office from 2001 to 2006) maintained his popularity by advocating the need for structural reform. Second, interest in global environmental problems and waste issues rose in the 1990s after the Rio Summit in 1992 and especially at the time of COP3, held in Kyoto in 1997. There was a growing and common understanding of the need to establish a society that had sound material cycles. Third, the end of the Cold War and the information technology (IT) revolution sped up economic globalization. It was argued that Japan's social and economic structures should shift from concentrating on the national economy to the globalized economy.

In 2000 six legislative instruments related to recycling were passed by the Diet: (1) the Basic Act on Establishing a Sound Material-Cycle Society, a law indicating the concept and basic framework of a society with sound material cycles; (2) the revision of the Waste Management and Public Cleansing Law; (3) the revision of the Law for the Promotion of Effective Utilization of Resources, through which the principles of "reduce," "reuse" and "recycle" became the ideals within waste policy; (4) the Construction Material Recycling Law; (5) the Food Recycling Law and (6) the Green Purchasing Law, which promotes the purchase of recycled and environmentally friendly goods by the government and public organizations to promote a shift in demand for such goods. Another important legislative action in 2000 was the reform of the national government that took effect in 2001, which reorganized the Environment Agency as the Ministry of the Environment and transferred the responsibilities for waste management from the Ministry of Health and Welfare to the Environment Ministry.

The aim of these six laws, together with the Containers and Packaging Recycling Law and the Home Appliance Recycling Law enacted later, is to go beyond improved waste processing to the formation of a sustainable "sound material-cycle society."

The structural recession of the 1990s provided a symbolic depiction of the limits of the "developing" type of regime that had successfully led Japanese economic development throughout the post-world war era. In this context, the environment became one of the key criteria for restructuring, especially among businesses. Therefore, this legislation can be considered a part of the wholesale restructuring of the Japanese economic and social system from a "developing" one into a "mature" one by taking the examples of Western and Northern European countries such as the Netherlands, Germany, Sweden, and Norway.

The policy direction of Japan towards a sound material-cycle society took on relatively more concrete visions in such areas as the role of stakeholders, the interaction of legislation and strategies, concrete quantitative targets to be achieved and a constant follow-up process under

the Fundamental Plan for Establishing a Sound Material-Cycle Society, initially released in 2003 and revised in 2008 and 2013.

4) International cooperation towards promoting 3R policies (late 2000s and onwards)

In the late 2000s, Japan pushed this strategy forward as an international initiative under the 3R Initiative. The 3R Initiative is Japan's initiative under the G8 process (the Group of Eight industrialized countries) to promote the "3Rs" (reduce, reuse and recycle) globally so as to build a sound material-cycle society through the effective use of resources and materials. It was agreed upon at the G8 Sea Island Summit in June 2004 as a new G8 initiative, and an action plan to promote the 3R policy, the Kobe 3R Action Plan, was agreed at the G8 Environment Ministers' Meeting in May 2008 in Kobe, Japan. Japan has successfully become a sound material-cycle society and is a leader promoting the 3Rs in Asia.

The Strategy for an Environmental Nation in the 21st Century, released in 2007, declared that Japan will promote the vision of a sound material-cycle society in accordance with different challenges faced by Asian countries by transferring institutional mechanisms, technological systems and experience in multi-stakeholder collaboration on the 3Rs and waste management by supporting national strategy development and city development.

Then, in 2009, in collaboration with several international organizations and research institutes, the Japanese government proposed the launch of the Regional 3R Forum in Asia and the Pacific, an inter- governmental forum to facilitate 3R policy implementation in Asia and the Pacific region with the participation of ministers, vice-ministers, and other ministerial-level participants from more than 30 countries as well as international organizations, research institutes, aid agencies, private entities, NGOs and experts.

After several high-level policy dialogues on issues, challenges and opportunities for 3R policy implementation in the region, the Fourth Meeting of the Regional 3R Forum, held in March 2013 in Hanoi, Viet Nam, released the Hanoi 3R Declaration, which came up with 33 goals relevant to 3R promotion in participating countries, covering issues in municipal solid waste, industrial waste, goals in rural areas, goals for new and emerging wastes and goals for cross-cutting issues. It also proposed associated sample indicators to monitor the progress of implementation of those goals. Japan has been promoting international cooperation for 3R policy implementation since the mid-2000s.

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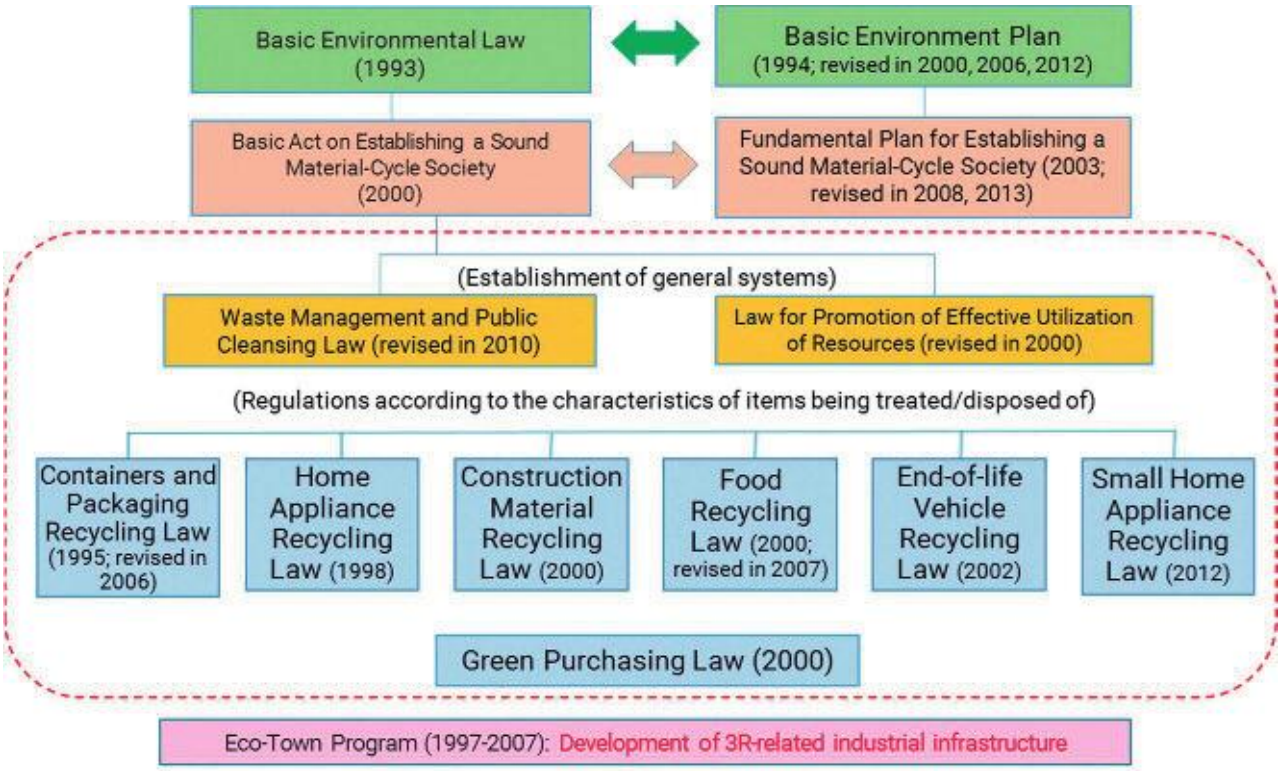
2.2 The policy framework

The policy framework for Japan's waste management and recycling is overviewed in the figure below.



Policy Framework for the 3Rs in Japan

Source: Revised from Y. Moriguchi (2006), "Establishing a Sound Material-Cycle Society in Asia," presented at the Asia 3R Conference, October 30-November 1, 2006, Tokyo, Japan.

1) The Basic Environment Law (1993) and Basic Environment Plan (1994, Amendment in 2000, 2006 and 2012)

The Basic Environment Law of 1993 established the overall framework for Japan's environmental policy, including waste management and recycling. With the enactment of this law, the emphasis of Japan's environmental policy shifted from preventing environmental pollution to addressing global environmental issues and sustainability issues. Some of the key principles of waste management such as Extended Producer Responsibility and the Polluter Pays Principle are mentioned in the Basic Law as responsibilities of producers and businesses. The Basic Environment Plan sets out the basic direction of environmental policy and is revised every six years. The current plan, developed in 2012, is the fourth such plan.

It emphasizes integrated efforts among goals related to a low carbon society (climate issues), a sound material-cycle society (waste management and recycling), and a society in harmony with nature (biodiversity).

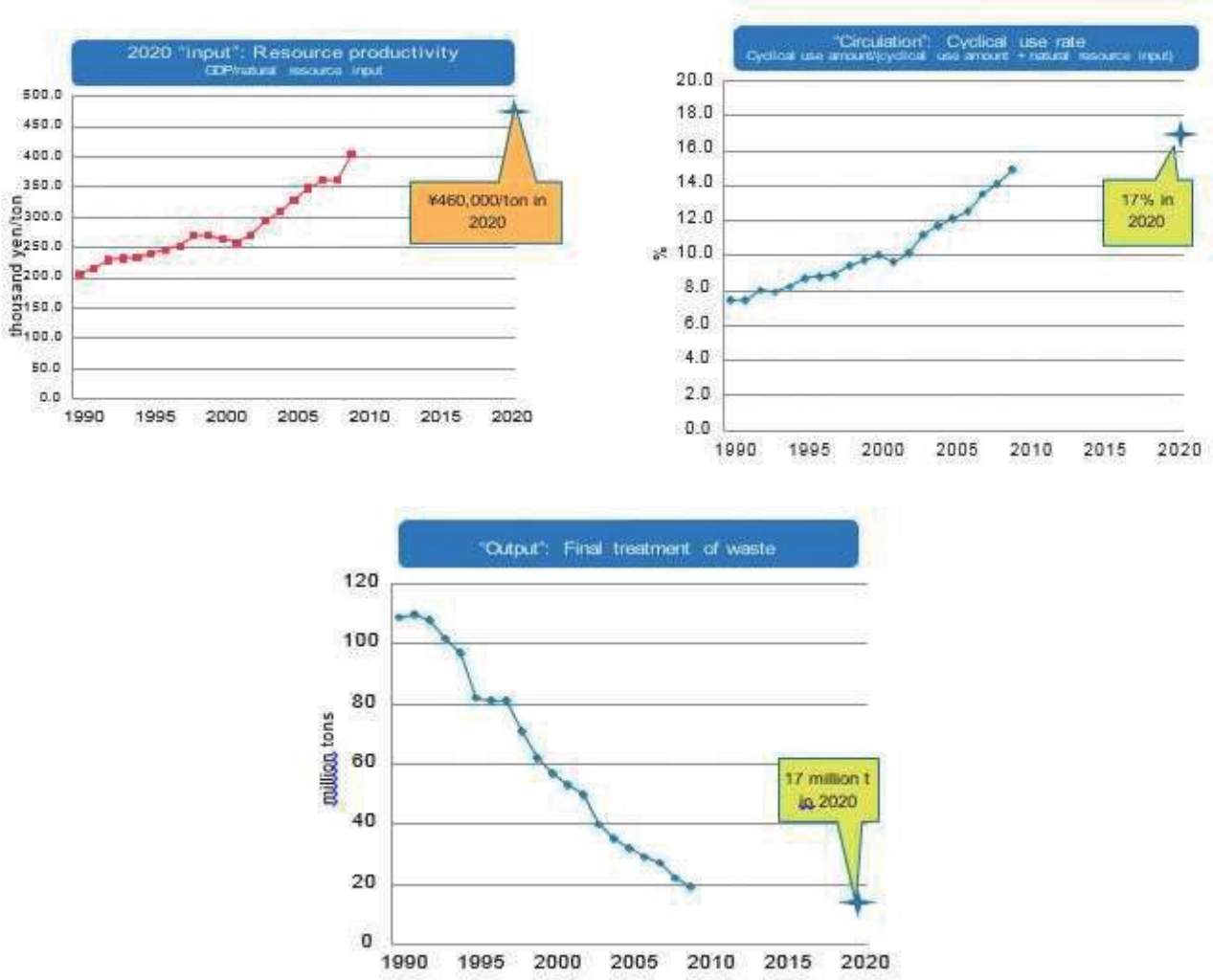
2) The Basic Act (2000) on and Fundamental Plan for Establishing a Sound Material-Cycle Society (2003, Amendment in 2008 and 2013)

The Basic Act on Establishing a Sound Material-Cycle Society is designed to facilitate the realization of the ideas expressed in the Basic Environment Law in the areas of waste management and recycling and a resource-efficient society. When the responsibilities for waste management were transferred to the Environment Ministry in 2001, the focus of Japan's waste management and recycling policy shifted from sanitation and disposal to resource utilization.

A variety of existing and new measures were placed within the framework of the "Basic Act on Establishing a Sound Material-Cycle Society" (2000). Also, the Fundamental Plan for Establishing a Sound Material-Cycle Society (2003) establishes numerical targets based on material flow accounting (MFA)-based indicators, designates particular roles for stakeholders and sets out an overall direction so that individual efforts will be consistent with the national goal of establishing a sound material-cycle society. Three major indicators and targets set

under the Fundamental Plan are resource productivity (GDP/resource input), cyclical use rate [cyclical use amount/ (cyclical use amount + natural resource input)] and amount of final disposal. The following figure shows the progress of these indicators and targets set under the Third Fundamental Plan in 2013.

A “sound material-cycle society” is defined within the Basic Act on Establishing a Sound Material-Cycle Society as “a society in which the consumption of natural resources is minimized, and the environmental load is reduced as much as possible by preventing products, etc. from becoming wastes, etc., promoting appropriate recycling of products, etc., when they have become recyclable resources, and securing appropriate disposal (as wastes) of the recyclable resources not recycled.”



Progress of MFA-based indicators and numerical targets set in Third Fundamental Plan

Source: Government of Japan (2013), Third Fundamental Plan for Establishing a Sound Material-Cycle Society

3) Waste Management and Public Cleansing Law and Law for Promotion of Effective Utilization of Resources

The Waste Management and Public Cleansing Law, enacted in 1971 to replace the earlier Public Cleansing Act, is at the core of Japan's waste management policy and regulations. The law regulates the proper treatment of two basic categories of wastes in Japan: municipal solid waste and industrial waste. In both waste categories, it sets forth the basic regulations for the following issues and aspects of waste management: 1) establishing the reduction of waste generation as a principle, 2) promoting proper treatment of waste (including recycling), 3) clarifying who holds responsibility for waste management (municipalities for municipal waste and industry for industrial waste), 4) regulating the establishment of waste treatment facilities, 5) regulating waste treatment operators, and 6) establishing waste treatment standards.

On the other hand, the Law for the Promotion of Effective Utilization of Resources promotes recycling as well as the other two Rs of "reduce" and "reuse." It stipulates the actual implementation of the 3Rs in specific industrial sectors as well as for specific products and recyclables. It requires the promotion of the 3Rs in ten industrial sectors (such as in the pulp and paper industry, chemical industry, steel industry, non-ferrous metal industry and for automobile manufacturers) and 69 items (such as personal computers and small secondary batteries).

4) Recycling-related laws for sorting, collecting and treating specific types of recyclables

To realize the idea of a sound material-cycle society and minimize waste generation, Japan introduced a series of recycling laws targeting specific product categories. These include the Containers and Packaging Recycling Law of 1995, the Home Appliance Recycling Law of 1998, the Food Recycling Law of 2000, the Construction Material Recycling Law of 2000, the End-of-life Vehicle Recycling Law of 2002, and the Small Home Appliance Recycling Law of 2012. For specific features of each law, see Chapter 3.2 through 3.7.

5) Building up a market through the Green Purchasing Law

The original purpose of the Green Purchasing Law of 2000 is to generate demand for products that use recyclables. Through specific recycling-related laws, Japan has worked to establish collection and treatment systems for specific recyclables. However, this alone will not make material circulation firmly rooted in society. Thus, the green purchasing law was originally developed to build up a market for green products to close the loop. The law requires the national government, local governments, national institutes and agencies to promote the procurement of recycled products.

6) Building up recycling infrastructure through the Eco Town Program

The Eco Town Program, established in 1997, takes as its goal the promotion of building advanced communities that are in harmony with the environment. It positions the concept of "zero emissions" (that is, the idea of aiming at eliminating waste by newly making use of all wastes generated by certain industries as raw materials in other industrial fields) as a basic concept for creating within a local community an economic and social system that is in harmony with the environment. It also promotes zero emissions as a basis for developing the local area.

When plans drafted by prefectures or by major (government-designated) cities in accordance with the characteristics of their own local areas received joint approval from the Ministry of the Environment and the Ministry of Economy, Trade and Industry, local public authorities and civil society groups received integrated and multifaceted support from either of the two ministries for projects undertaken based on these plans. One part of that support until fiscal 2007 was assistance for plants, facilities and equipment. When these plans were drafted by smaller cities, towns and villages (including partial affairs associations), the plans had to be formulated jointly with the prefecture or another similar entity. After the Program was launched, a total of 26 local areas were approved as eco towns, including the cities of Kawasaki and Kitakyushu.

7) Governance for policy implementation

The Basic Environment Plan, the Fundamental Plan for Establishing a Sound Material-Cycle Society and all product-specific recycling laws are reviewed periodically (every five years, except every six years in the case of the Basic Environment Plan). Therefore, every five to six years, various stakeholders can convey their opinions and messages to the national government on policies. It is important for the national government to reflect these views when revising recycling laws.

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- Environment White Paper of Japan http://www.env.go.jp/en/wpaper/
- The Basic Environment Law of Japan http://www.env.go.jp/en/laws/policy/basic/
- The Fourth Basic Environment Plan of Japan
- English brochure, part 1: http://www.env.go.jp/policy/kihon_keikaku/plan/plan_4/attach/pamph_en-1.pdf English brochure, part 2: http://www.env.go.jp/policy/kihon_keikaku/plan/plan_4/attach/pamph_en-2.pdf
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2.3 Policies for specific waste streams in Japan

1) Rapid increase of waste along with economic growth and responsibility for waste disposal

Along with economic recovery and growth after World War II, Japan's population began shifting towards the cities. Accompanying this shift in population was an increase in the amount of waste being handled by municipalities.

In 1963, the national plan established in response to the Act on Emergency Measures Concerning the Improvement and Construction of Industrial Waste Disposal Facilities included a policy of incinerating municipal waste and burying the residue. This prompted the construction of incineration facilities in individual municipalities throughout Japan.

There were, however, some municipalities in which the construction of such facilities met with strong opposition from local residents. With regard to the construction of final waste disposal plants in particular, conflict arose between municipalities that were generating waste and those that were processing it, a development that became known as the "garbage war."

Increased industrial activity and growth in the Japanese economy overall were accompanied by greater amounts of waste, leading to an increase in illegal disposal and environmental pollution.

In 1970, the national government took on the growing problem of environmental pollution by revising the Public Cleansing Act to create the Waste Management and Public Cleansing Law. This new law differentiated between industrial waste and municipal solid waste, stipulated who held responsibility for disposal and established penalties for illegal dumping. One of the important concepts in this law was the placing of responsibility for the proper disposal of all waste generated by through business activities, whether industrial or municipal solid wastes waste, on the businesses that generated sit. Since industrial waste may cause environmental pollution, the law was based on the Polluter Pays Principle (PPP).

The law also stipulated that businesses take responsibility for facilitating ease of disposal not only in the manufacture of products, but also in the manufacture of containers as well as the processing and sale of products.

The Waste Management and Public Cleansing Law, the foundation for the development of Japan's current waste disposal system, came into force the following year, in 1971.

2) Stipulating discharger responsibility through legal revisions

Despite such regulations, these measures proved to be insufficient because of the priority being placed at the time on economic growth. This resulted in measures that addressed superficial waste issues only while failing to address the establishment of a basic waste disposal system.

This led to serious environmental issues such as the illegal industrial waste disposal seen on Teshima Island in Kagawa Prefecture.

The Teshima Island issue

The case of Teshima Island raised the public's awareness about the problem of industrial waste.

An industrial waste disposal company illegally disposed of massive amounts of industrial waste and conducted open burning of waste between 1983 and 1990 on Teshima Island in Kagawa Prefecture. The amount of industrial waste and contaminated soil totalled 560,000 m3 and it is estimated that the ultimate cost of proper disposal will reach 45 billion yen. After a long-running court case, Kagawa Prefecture took responsibility for disposal, because it had approved the operator. The prefecture started the cleanup work in 2000 and aims to complete it by 2017.

Inappropriate disposal of industrial waste not only affects the environment but also requires extended periods of time and great expense to return contaminated areas to their original state.

Faced with these major issues, the Japanese government sought to establish a system stipulating the responsibility of dischargers.

This system included waste disposal planning, the visualization of waste disposal processes based on a manifesto management system, and stricter requirements for approving operators in accordance with the concept of discharger responsibility to ensure the appropriate handling of waste disposal. In order to clearly stipulate such responsibility, the Japanese government repeatedly revised laws concerning waste disposal.

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Chapter 3 Implementation and enforcement of specific policies

3.1 Implementation at the national and local levels

1) The Fundamental Plan for Establishing a Sound Material-Cycle Society

The Third Fundamental Plan for Establishing a Sound Material-Cycle Society states that the national and local governments must cooperate when solving problems.

In regard to the responsibilities of these administrative bodies, the national government is expected to make comprehensive efforts for establishing a sound material-cycle society by developing partnerships with relevant actors and carrying out necessary measures adequately. On the other hand, local governments are expected to be responsible for establishing a sound material-cycle society in their local communities while also playing a coordinating role for relevant actors regarding the implementation of the appropriate cyclic use and disposal of waste.

2) Guidelines for the Basic Master Plan on Waste Disposal

Guidelines exist for drawing up master plans that lay out measures for waste reduction through sound waste management and the promotion of the 3Rs at the level of the local authorities. These are the "Guidelines for the Basic Master Plan on Waste Disposal," first developed in 1993 and then revised in 2008 and 2013. The following provides an overview of these guidelines.

Development of a master plan by local governments

- Under article 6, section 1 of the Waste Management and Public Cleansing Law, local governments are required to establish a plan for the disposal of municipal waste generated within their jurisdiction.
- In accordance with the items stipulated in the Guidelines for the Basic Master Plan on Waste Disposal, local governments are to create a Master Plan for Municipal Waste Disposal/Fundamental Plan for Establishing a Sound Material-Cycle Society.
- From a long-term perspective of 10 to 15 years, the Master Plan for Municipal Waste Disposal clarifies the modalities of collection, transport, intermediate processing and final disposal of municipal waste and the measures necessary for these. This master plan is reviewed and revised roughly every five years.
- Local governments are to create a Waste Disposal Implementation Plan each year to demonstrate how the measures developed in the plan will be carried out in actual waste disposal administration. The collection, transport, intermediate processing and final disposal of waste are implemented based on this plan.

Cooperation for waste disposal data management

- The Ministry of the Environment carries out an annual Survey on Municipal Waste Disposal among municipalities across Japan for the purpose of obtaining basic information on municipal waste disposal administration. In their responses, local governments provide the ministry with detailed data regarding such matters as the state of waste generation and disposal, refuse incineration facilities, final disposal sites, waste management expenses and 3R efforts.

3) Frameworks to facilitate cooperation between the national and local governments

The following is the major framework for facilitating cooperation between the national and local governments.

1: Promote the 3R policies of local governments through information on the policies provided by the national government;
2: Support the development of recycling infrastructure through grants/subsidies from the national government;
3: Have exchanges of views between the national and local governments and focus on issues.

1: Promote the 3R policies of local governments through information on the policies provided by the national government

The national government assists local governments, facilitating their efforts through developing various new 3R concepts, preparing guidelines, and providing information on 3R policies, including introducing previous cases.

2: Support the development of recycling infrastructure through grants/subsidies from the national government

Grants for a Sound Material-Cycle Society

This is a program in which local governments (municipalities) develop a plan for waste management and recycling facilities in an extensive and comprehensive manner (a Regional Plan for the Formation and Promotion of a Sound Material-Cycle Society), and the national government provides grants for the development of facilities appearing within the plan[1]. This program aims to establish relevant facilities, including facilities for promoting the material cycle, facilities for promoting energy recovery, facilities for promoting organic waste recycling and final disposal sites, while also aiming to renovate and extend the lives of these facilities.

The Eco Town Project

The Eco Town Project, implemented from 1997 to 2007, aimed to promote environmental industries and facilitate a sound material-cycle society. (See chapter 2.2.2.) Under this project, local governments were responsible for submitting an eco-town plan prepared in cooperation with private companies.

The cities of Kawasaki and Kitakyushu faced difficulties securing sites for waste disposal and waste processing and recycling facilities and encountered an economic downturn as a result of the industrial hollowing out of the 1990s. Consequently, these cities needed to provide a boost for their industries. In this way, the Eco Town Project coincided with the interests of these local governments.

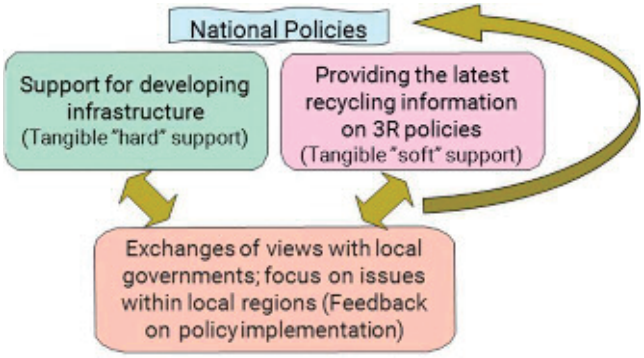
As various types of recycling laws were established, the Eco Town Project began to take on characteristics of developing industrial infrastructure. As a result, the project shifted to being a development project for sound material-cycle industries.

3: Have exchanges of views between the national and local governments and focus on issues

When the national government carries out policies, it first provides explanations to prefectures and designated cities. Subsequent to that, prefectures conduct regional coordination and also provide explanations to their municipalities.

Furthermore, the following system enables the national government to regularly obtain feedback from local governments.

- Regional Offices of the Ministry of the Environment: These offices have a direct relationship with municipalities, and views in each region collected by the regional offices are shared through daily communication and managerial meetings. Regional offices also support policy implementation through joint on-site inspections with prefectures, collection of various views at block meetings and assistance for business operators.



Cooperation between the national and local

- Japan Waste Management Association: This is an organization of the officials in charge of waste disposal within local governments. Requests from each region are reported to the national government at an annual meeting (or meetings, as requested).
- Personnel exchange opportunities between the national and local governments: The actual conditions of the local areas come to be reflected in national policies through daily exchanges of views between local government personnel seconded to positions in the national government and national government officials.
- Invitation of the representatives of the Association of Prefectural Governors and the National Association of Towns and Villages to meetings for feedback and review hosted by the national government

4) Approaches to household waste

As noted earlier, municipalities are responsible for the handling of household waste.

Japan's limited landmass, however, means that the vast majority of municipalities face problems in securing adequate final disposal sites. The rapid urbanization of the city of Kawasaki following World War II resulted in a high rate of land use, and this prevented the building of large-scale final disposal facilities in inland areas. To address this, the city opened landfills in 1978 after exploring safe ways to treat incineration ash, including through the improvement of revetments.

[1] Ministry of the Environment of Japan. http://www.env.go.jp/recycle/waste/3r_network/index.html (available in Japanese)

The current landfill site from the second phase, however, is the city's last available landfill site, and the number of years remaining until the site reaches capacity was estimated at 23 as of 2004. This situation highlighted the need to reduce waste to prolong the viability of the site. In addition, incineration facilities have deteriorated, raising concern about the stability of processing.

Landfill site in Kawasaki

In response, Kawasaki City established its "Waste Management Basic Plan (The Kawasaki Challenge for 3Rs)" to carry out its waste management responsibilities.

This plan aims to prolong the availability of landfill sites and replace waste processing centres in a planned manner through the reduction and recycling of waste.

Measures taken based on this plan have succeeded in extending the remaining number of years for utilizing the Kawasaki's landfill site roughly 40 years, until fiscal 2056. In addition, the 500,000 tons of incinerated waste in fiscal 2003 was expected to decrease to 370,000 tons in fiscal 2015. As a result, in April 2015, the city's four incineration facilities that had been in operation until then were able to transition to a system in which only three incineration facilities were operating while the fourth underwent replacement.

In the years to come, based on the "Kawasaki City General Waste Processing Plan: Cutting down on waste: an Eco-gurashi plan for the future" launched in fiscal 2016, the city will go beyond its efforts thus far to not only increase awareness about recycling but also promote the two Rs (reduce, reuse) which have even less environmental impact than recycling. As part of this plan, it will also promote integrated measures toward resource recycling, low carbonization, and environmental coexistence.

Overview of the Kawasaki City General Waste Processing Plan

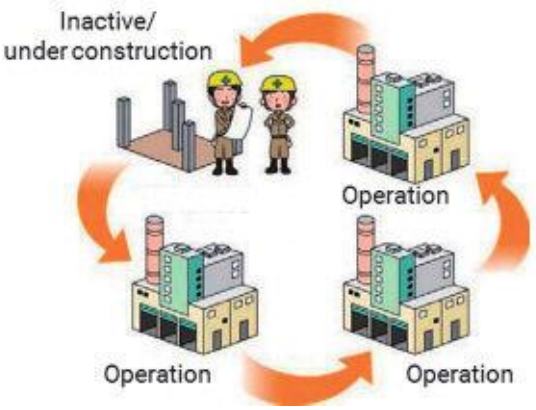
Period: FY 2016 - FY 2025
Basic principle: Working to achieve a sustainable, environmentally-friendly community

Basic policy

- Respond effectively to social changes and strive for a society that generates as little waste as possible
- Implement Eco-gurashi through collaboration between residents, businesses, and municipal governments, and further implement the 3Rs
- Ensure a comfortable living environment where people can live healthy lives with peace of mind

Objectives (Base year: fiscal 2015)

- Reduce waste volumes by 10% per person (998g → 898g)
- Reduce incinerated waste volumes by 40,000 tons (370,000 tons → 330,000 tons) (Reduce household waste by 20,000 tons & business-generated waste by 20,000 tons)



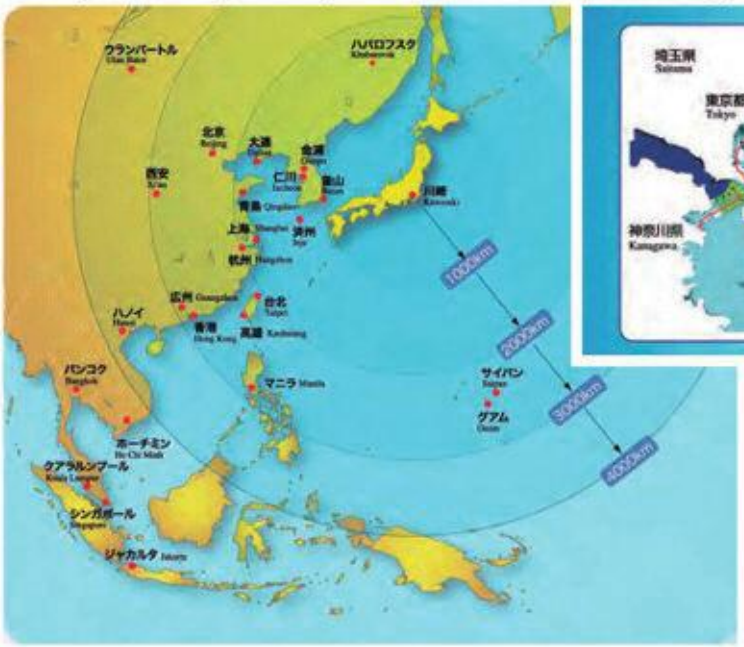
Replacement of incineration facilities

Basic principle	Working to achieve a sustainable, environmentally-friendly community	
Basic policy	○ Respond effectively to social changes and strive for a society that generates as little waste as possible ○ Implement Eco-gurashi through collaboration between residents, businesses, and municipal governments, and further implement the 3Rs ○ Ensure a comfortable living environment where people can live healthy lives with peace of mind	
Basic initiatives	"Eco Resident" initiatives	(1) Promoting environmental training and education (2) Promoting information sharing (3) Stepping up resident participation
	Initiatives to reduce waste volumes and boost recycling	(1) Household waste reduction/boosting household-generated recyclables (2) Business-generated waste reduction/boosting recycling (3) City-led waste reduction and recycling initiatives (4) Kitchen waste reduction/boosting kitchen recycling
	Initiatives on establishment of waste disposal facilities	(1) Establishing a safe and reliable waste processing system (2) Stable operations of the system of three waste processing centers (3) Building effective and efficient processing systems
	Initiatives to forge a healthy and comfortable living environment	(1) Community cleanup initiatives (2) Promoting initiatives to address resident needs (3) Initiatives to prevent inappropriate waste disposal
	Initiatives to facilitate a low-carbon society as well as beneficial coexistence with nature	(1) Effective use of energy resources (2) Effective use of recyclables with a view to low carbonization and beneficial coexistence with nature (3) Building of environmentally-friendly processing systems (4) Initiatives to utilize the sum total of our environmental technologies

Diagram: System of the Basic Plan

Introduction of Kawasaki City

Kawasaki City is located almost in the centre of Japanese Archipelago. The city has been upholding Japan's industry as a core region of the Keihin Industrial Zone during the period of rapid economic growth. While making the most of human resources and industries developed and concentrated at the region during this period, Kawasaki City has transformed into an international industrial and R&D city with a great umber of global companies and R&D institutions that own cutting-edge technologies for environment and other fields.



In Kawasaki City adjacent to the nation's capital, Tokyo, there are elaborate system of trains and roads leading into major cities of Japan. It takes only 90 minutes to Narita Airport and 15 minutes to Haneda Airport by train from the city.

5) Approaches to waste generated by business operators

Waste discharged by business operators is classified into industrial waste specified by law and other business-related waste.

As noted earlier, business operators are responsible for handling waste generated through their business activities and for using an appropriate system for waste management. In addition to supporting appropriate management by accepting non-industrial waste generated by business operators, municipalities also help business operators reduce industrial waste and promote recycling within the operators' responsibility for waste management. Municipalities supervise and provide instruction regarding consignment to qualified waste disposal operators capable of handling industrial waste, including waste containing hazardous substances such as asbestos, PCBs and infectious wastes.

Furthermore, municipalities certify industrial waste disposal operators and waste disposal facility owners after confirming that they meet the requirements for approval stipulated by law.

Municipalities also conduct periodic on-site inspections of business operators and industrial waste disposal operators to confirm their compliance with laws, provide administrative guidance in the event of inappropriate waste management and take administrative action against dishonest business operators.

Illegal waste disposal not only imparts significant damage on the environment but also creates a great financial burden on municipalities bearing the cost of recovery operations and decreases residents' trust in waste management.

To prevent this, the city of Kawasaki cooperates with the Kawasaki City Council for the Prevention of Illegal Waste Dumping and other entities to implement daily patrols for sites where wastes are being illegally disposed, and has taken special measures such as installing cameras at sites where massive amounts of waste have been illegally disposed.

Although not required to do so by law, Kawasaki established an Industrial Waste Management Guidance Plan in 1991. This plan includes basic policies for municipal guidance in industrial waste management in accordance with environment-related administrative plans, laws and regulations stipulated by national and local governments.

This plan takes as its basic principle the realization of a sound material-cycle society that ensures environmental protection along with safety and peace of mind and pays attention to quality. Four areas are set forth as the main pillars for promoting the plan, namely actively supporting measures taken by business operators involved in promoting the 3Rs in a manner that prioritizes the 2Rs of reduce and reuse; promoting even further the proper processing and disposal of industrial waste; promoting means for processing and disposing of industrial waste that are desirable from the perspective of climate change countermeasures in broad terms, aiming at the creation of a sound material-cycle society and the realization of a low-carbon society; and advancing consideration of cooperation and coordination with industrial waste disposal operators, industrial waste councils, and others regarding the processing and disposal of industrial waste and disaster waste, should a disaster strike. Indicating these main pillars to the public encourages voluntary measures by business operators and provides for fair and equitable guidance on the part of the city.

This plan is reviewed every five years to stay current with changes in the social and economic situation as well as the state of industrial waste. Kawasaki is currently implementing measures based on its Sixth Industrial Waste Management Guidance Plan (2016-2020).

Biohazard mark (Infectious)

Asbestos mark
(Construction materials containing asbestos)

Sixth Industrial Waste Management Guidance Plan

Basic principle: Realization of a sound material-cycle society that ensures environmental protection along with safety and peace of mind and pays attention to quality.

Key measures

Promotion of 3Rs

- Promotion of 3Rs with priority of 2Rs (Reduce and Reuse) for businesses
- Reduction of natural resource consumption, environmental impact and amount of final disposal

Promotion of sound treatment

- A more throughout the utilization of circular resources and the treatment of non recyclable substances within the laws
- Guidance on safety and security of waste treatment and securing of sound treatment

Promotion of measures against global warming

- Promotion of waste treatment appropriate for measures against global warning for generators and business sectors of industrial waste treatment
- Promotion of measures against global warming on industrial waste management by applying energy in biomass resources

Response for large-scale disasters and emergency cases

- Consideration of cooperation among domestic waste treatment companies, Association of Industrial Waste Management in Kanagawa, etc., for industrial waste management and disaster waste management in a case of disasters
- Promotion of actions to secure safety in an emergency case of a new virus spreading

Individual measures

Promotion of 3Rs

- Promotion of reduction by businesses discharging a vast quantity of waste
- Promotion of 2Rs by generators
- Promotion of each recycling law
- Guidance to reduction of amount of final disposal
- Promotion of Construction Material Recycling Act
- Utilization of renewable resources containing in water and wastewater
- Promotion of activities on environmental technologies
- Promotion of green procurement

Promotion of sound treatment

- Promotion of improvement of industrial waste management companies
- Promotion of use of electronic manifesto
- Promotion of sound management for asbestos waste
- Promotion of sound management of PCB waste
- Promotion of sound management of infectious industrial waste
- Promotion of sound management of mercury waste
- Sound management of other hazardous waste
- Further guidance to waste generators of industries and industrial waste management companies
- Promotion of prevention of illegal dumping
- Promotion for countermeasure of illegal dumping
- Promotion of prevention of unsound management practices at inter-regional level

Promotion of measures against global warming

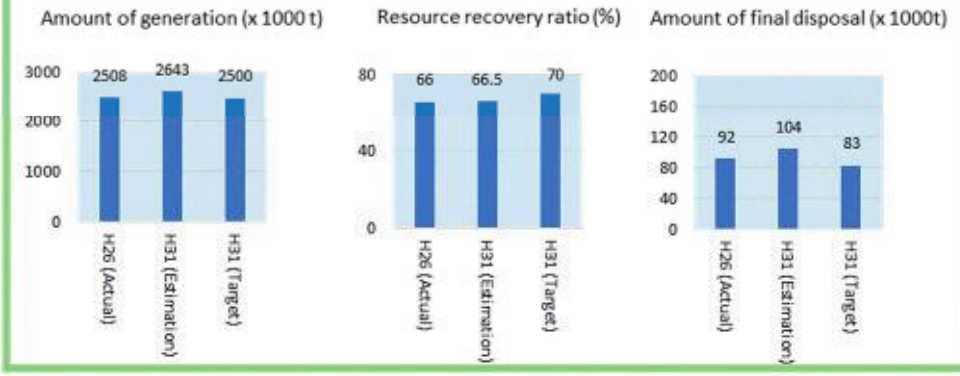
- Promotion of voluntary activities on measures for global warming relating to industrial waste treatment
- Prevention of GHG gas emission generated from transportation vehicles of industrial wastes
- Public awareness on utilization of energy from waste
- Promotion of utilization of biomass resources

Response for large-scale disasters and emergency case

- Response for large-scale disasters
- Response for emergency cases

Numerical goal

- **Amount of generation**: 2,500,000 tonnes in 2019
- **Resource recovery ratio**: 70% (recyclables and amount of recycling) in 2019
- **Amount of final disposal**: 83,000 tonnes in 2019



Key individual measures

Promotion of prevention by large scale generators	Guidance to reduce amount of final disposal	Promotion of sound treatment for PCB waste	Promotion of biomass resources	Response for large-scale disasters and emergency cases
The large scale generators account for about 70% of industrial waste generation. Promotion of 3R activities with the priority of 2R is conducted for them.	Promotion of measures to reduce amount of final disposal due to increase of construction sludges, because amount of construction waste would be increased caused by infrastructure redevelopment for the Toyo Olympics in 2020.	Intensive announcement of the treatment deadlines to storage companies is made based on the national action plan for PCB. Promotion of further measures, including identification of un-known PCB, would be made	Renewable and biological resource contributes the prevention to use fossil fuel that its huge amount has been used so far, and that resource is possible to become an alternative resources. Environmental awareness will be raised for promotion of biomass resources.	Information on waste management measure for large-scale disasters is shared. Cooperation among industrial waste management companies beyond the city area is strengthen for disaster waste issues.

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- Aoki-Suzuki, Chika and Hotta, Yasuhiko. (2011). “Case Study of Japan: Policy Instruments for Improved Collaboration Between the National and Local Governments in Japan” (in Japanese). In Annex to Chapter 3-1, Asia Resource Circulation Policy Research Project, Regional Policy Studies Report 2010: Improving Governance for 3R Policy Implementation. Research Project Commissioned by Ministry of the Environment, Japan, in Fiscal 2010.

3.2 Holistic waste management approach for solid waste, liquid waste and gaseous emissions

1) Progress in waste disposal management in Japan

The foundation of Japanese laws and regulations for waste management was the Clean Feculence Act, established for the hygienic handing of waste in 1900. This law was revised and became the Public Cleansing Act in 1954 for the purpose of improving public sanitation through the maintenance of clean living environments.

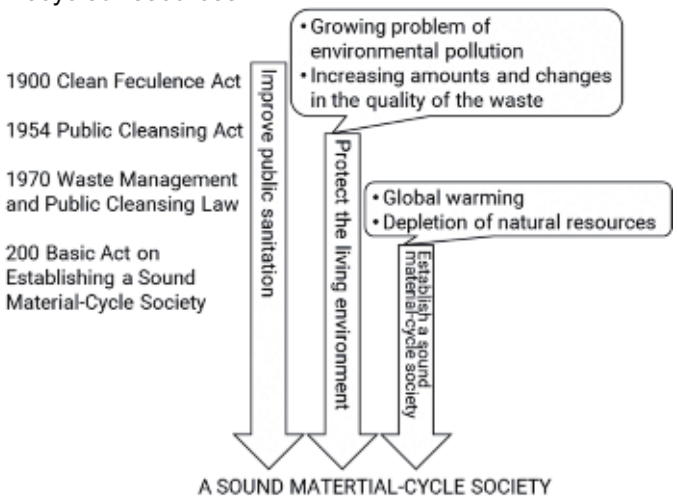
During the period of high economic growth from the 1950s to the 1970s, the national government took on the growing problem of environmental pollution caused by soot and smoke and drainage from industrial plants as well as the increasing amounts of, and changes in the quality of, waste being generated in urban areas. One result of the government's efforts was the Waste Management and Public Cleansing Law, one of the 14 antipollution laws passed in 1970, which replaced the existing Public Cleansing Act. This new law included the concept of protecting the living environment, a concept commonly found in antipollution laws, as well as improving public sanitation from the standpoint of appropriate waste management.

Air and water pollution were gradually reduced with the establishment of laws and regulations. The Waste Management and Public Cleansing Law, on the other hand, was not effective in addressing the issue of waste. As Japanese economic growth continued, society grew accustomed to a lifestyle based on mass production, consumption and disposal.

An economy based on mass production and consumption created a society that generated a tremendous amount of waste, which in turn interfered with protection of the environment and the sound circulation of materials. Furthermore, mass production and consumption are closely associated with a wide range of environmental problems such as global warming due to greenhouse gas emissions, the depletion of natural resources and the destruction of nature through the large-scale extraction of resources.

In 1992, the United Nations Conference on Environment and Development (UNCED), commonly known as the Rio Summit, was held in Rio de Janeiro, Brazil. Discussion among participating countries on the importance of addressing environmental issues at a global scale led to the establishment of rules for the protection of the global environment and the promotion of sustainable development.

In 2000, Japan established the Basic Act on Establishing a Sound Material-Cycle Society. Through this act the Japanese government aims to foster a material-cycle society, in which natural resources are conserved and the environmental load is reduced to the greatest extent possible through the reduction of waste and utilization of recycled resources.



History of laws and regulations concerning waste management in Japan

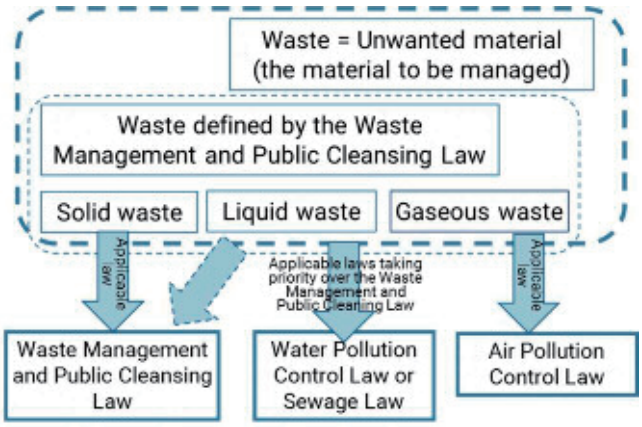
2) Overall waste management methods

The Waste Management and Public Cleansing Law defines waste as solid or liquid matter.

While the Waste Management and Public Cleansing Law stipulates the general legal system for the handling of waste, specific measures also exist. If waste in a category stipulated by the Waste Management and Public Cleansing Law is also subject to regulatory measures under other systems due to other laws, the specific measures take precedence if the standards applied therein are equal or higher than those prescribed by the Waste Management and Public Cleansing Law. For example, the Water Pollution Control Law takes precedence when applied to industrial wastewater discharged to public water areas, while the Sewerage Law takes precedence when applied to sewage discharged to final sewage treatment facilities. The water discharged must be in compliance with the standards set forth in the relevant law.

According to this concept, waste is governed under the laws described below based on the characteristics of the waste.

- Solid waste: Waste Management and Public Cleansing Law
- Liquid waste: Water Pollution Control Law or Sewerage Law
- Gaseous emissions: Air Pollution Control Law



Overall laws and regulations concerning waste management in Japan

3) Methods for managing waste according to its characteristics (solid waste)

The Waste Management and Public Cleansing Law applies to solid waste. Solid waste is classified into municipal solid waste and industrial waste. Municipal solid waste means waste from people's daily lives, human excrement, and waste from businesses that can be processed by municipal waste disposal facilities. Municipalities bear responsibility for the management of such waste. Industrial waste is waste generated through business activities falling into one of twenty categories stipulated under the Waste Management and Public Cleansing Law, for which business operators bear responsibility for managing.

The major content of the regulation serves to prohibit the illegal disposal of waste and illegal open burning and stipulates standards for the processing of both municipal solid waste and industrial waste, approval of waste disposal operators, approval of installation of waste disposal facilities and equipment and so on.

4) Methods for managing waste according to its characteristics (liquid waste)

As special laws addressing waste, the Water Pollution Control Law and Sewerage Law, which apply to liquid waste, take precedence over the Waste Management and Public Cleansing Law, which is a general law.
The Water Pollution Control Law stipulates certain categories of facilities subject to regulation, and the Sewerage Law targets the facilities designated under the Water Pollution Control Law.

Both laws stipulate procedures for advance notification required to install target facilities and standard concentrations (acceptable limits) of regulated substances in wastewater (Water Pollution Control Law: 28 hazardous substances and 15 other substances; Sewerage Law: 27 hazardous substances and 13 other substances).

Furthermore, the Water Pollution Control Law stipulates chemical oxygen demand (COD) for plants of a certain size or greater located in closed water areas and controls the discharge from businesses of wastewater containing hazardous substances into the ground. Liquid waste not subject to these laws falls under the Waste Management and Public Cleansing Law. The content of the regulation is the same as that for solid waste.

5) Methods for managing waste according to its characteristics (gaseous emissions arising through the incineration of waste)

The Air Pollution Control Act applies to gaseous emissions. The gaseous emissions regulated by this law are soot and smoke, which means sulphur oxides (SOx), soot and dust and hazardous substances (such as chlorine, hydrogen chloride and nitrogen oxide [NOx]) generated during combustion. The facilities regulated by this law are classified into 33 categories, and facilities equipped with burners whose combustion capability reaches a certain level are designated as facilities that generate soot and smoke. The law stipulates procedures for advance notification required to install target facilities, standards for controlling the total emissions of soot and smoke from facilities and standards for controlling the total emissions of SOx and NOx that apply to large-scale plants.

In addition, the Air Pollution Control Act regulates the emission of volatile organic compounds and particulates and promotes measures against hazardous air pollutants and so on.

6) Relationship between the Waste Management and Public Cleansing Law and other recycling laws

To create a legal infrastructure for the establishment of a sound material-cycle society, the Japanese government established or revised six recycling laws, including the Basic Act on Establishing a Sound Material-Cycle Society (2000), the Waste Management and Public Cleansing Law, the Containers and Packaging Recycling Law (1995), and the Small Home Appliance Recycling Law (2012).

These individual recycling laws set the conditions for the collection and transportation of waste stipulated by the Waste Management and Public Cleansing Law and promote the recycling of waste.

7) Waste management methods (measures) adopted by waste disposal facilities

Municipal Waste Disposal Standards regulate waste management according to the type of waste and the processing undertaken (collection, transport, storage and disposal). In addition, a qualification system has been adopted to approve the construction or renovation of waste disposal facilities.

The approval process takes into consideration the type of waste to be handled, processing methods and the ability for the waste to be properly handled from the viewpoint of protecting the living environment. Qualification standards for waste disposal facilities cover structures, management, protection of the living environment of surrounding areas and appropriate consideration for other facilities in the area.
Waste disposal facilities must meet these standards to be approved.

In addition, waste disposal facilities are required to employ qualified specialists to ensure appropriate management. For the control of pollution such as gas emissions and discharge water from facilities, the Air Pollution Control Act and Water Pollution Control Law regulate the waste disposal procedures.

8) Mini-assessment for waste disposal facilities

Approval requires municipal assessment of a waste disposal facility's impact on the living environment in the surrounding area. This is referred to as a mini-assessment, which covers air, noise, vibration, odour, water quality, and underground water, aspects of the environment that may be influenced by the operation of the facility and the transport and storage of waste handled thereby.
The assessment allows municipalities to confirm that the waste facility structure and management are designed to ensure the protection of the living environment in the surrounding area.

9) Examples of waste disposal facilities associated with the Waste Management and Public Cleansing Law and with specific recycling laws

Specific laws are in place to promote the recycling of used products, and there are certain certification criteria in which disposal operations are exempt from approval stipulated by the Waste Management and Public Cleansing Law. However, there are no exemptions to the qualification standards for the installation of waste disposal facilities.

Kawasaki is home to waste disposal facilities subject to the Home Appliance Recycling Law and the Containers and Packaging Recycling Law.

10) Use of environmental impact assessments in accordance with municipal ordinances

An environmental impact assessment requires business operators and land developers to project and evaluate the likely impact of a proposed undertaking or development involving changes in land configuration, etc. by taking into account the natural environment, regional living environment and socio-cultural environment prior to decision-making. The process also includes disclosing the results, exchanging views with residents in the area and shaping projects to suit the local environment. This system is effective in preventing environmental pollution and ensuring a favourable environment.

The city of Kawasaki established environmental impact assessment ordinances in October 1976, ahead of other cities in Japan. In addition, it set forth a Regional Environment Management Plan to promote environmental protection and stipulates the items to be considered in environmental impact assessments (see the table below). The city requires business operators to carry out investigations, forecasts and evaluations regarding these items and conserve the environment while reflecting the opinions of local residents.

Large Category	Middle Category	Small Category
Air	Air quality	Air quality
	Odors	Odors
	Other	Air environment elements other than those mentioned above
Water	Water quality	Public water area / underground water
Soil	Soil contamination	Soil contamination
Noise / vibration / low-frequency sounds	Noise / vibration / low-frequency sounds	Noise
		Vibration
		Low-frequency sounds
Wastes	Wastes	Municipal solid waste
		Industrial waste
		Soil generated during construction
Safety	Safety	Fires / explosions / leakage of chemical substances, etc.

Major environmental impact assessment categories and items

References

- Japan Environmental Sanitation Center. (2012). Manual for the Waste Management and Public Cleansing Law, FY2012 Edition.
- United Nations Environment Programme. (2013). The Japanese Industrial Waste Experience: Lessons for rapidly industrializing countries.

3.3 Packaging waste

[1] National policy

1) Background and objective

An immense amount of waste resulted from mass production and mass consumption, making the capacity limitations of final disposal sites a serious issue, while the siting of incineration facilities became increasingly difficult. Against this backdrop, it became necessary to promote the sorted collection and recycling of containers and packaging waste, which accounted for a large portion of municipal solid waste (approximately 60% by volume). In response to this situation, the Containers and Packaging Recycling Law was enacted and promulgated in June 1995 (with a portion entering into force in December 1995). The 2006 revision of the law added items whose disposal as waste should be minimized, resulting in efforts to reduce the use of plastic shopping bags and other items.

2) Roles of the parties concerned

The roles of the parties concerned are as follows:

Municipalities	Develop a plan for sorted collection Carry out sorted collection Conduct awareness campaigns
Consumers	Minimize container and packaging waste Carry out sorted disposal in accordance with the sorted collection plan
Specified business operators, including importers	Minimize waste from containers and packaging being used, manufactured or imported Conduct recycling (obligatory)
National government	Conduct educational campaigns and PR activities targeting the general public

3) Characteristics of the recycling system

The Containers and Packaging Recycling Law is intended to cover the containers and packaging wastes in the following table.

Among these types of waste, containers and packaging that can be transferred through sorted collection for remuneration or without charge, such as steel cans and cardboard, are excluded from the scope of recycling under the law.

Therefore, what is subject to recycling is the four items indicated in the table above (glass bottles, other paper containers and packaging, PET plastic bottles, and non-PET plastic containers). Specified business operators — users, manufacturers and importers – are required to recycle containers and packaging waste that meet certain conditions. Specified business operators may recycle them by themselves or consign the recycling processing to the Japan Containers and Packaging Recycling Association, designated as a producer responsibility organization. The Japan Containers and Packaging Recycling Association does not own recycling processing facilities. It selects by public tender business operators that meet certain conditions and entrusts recycling processing operations to them.

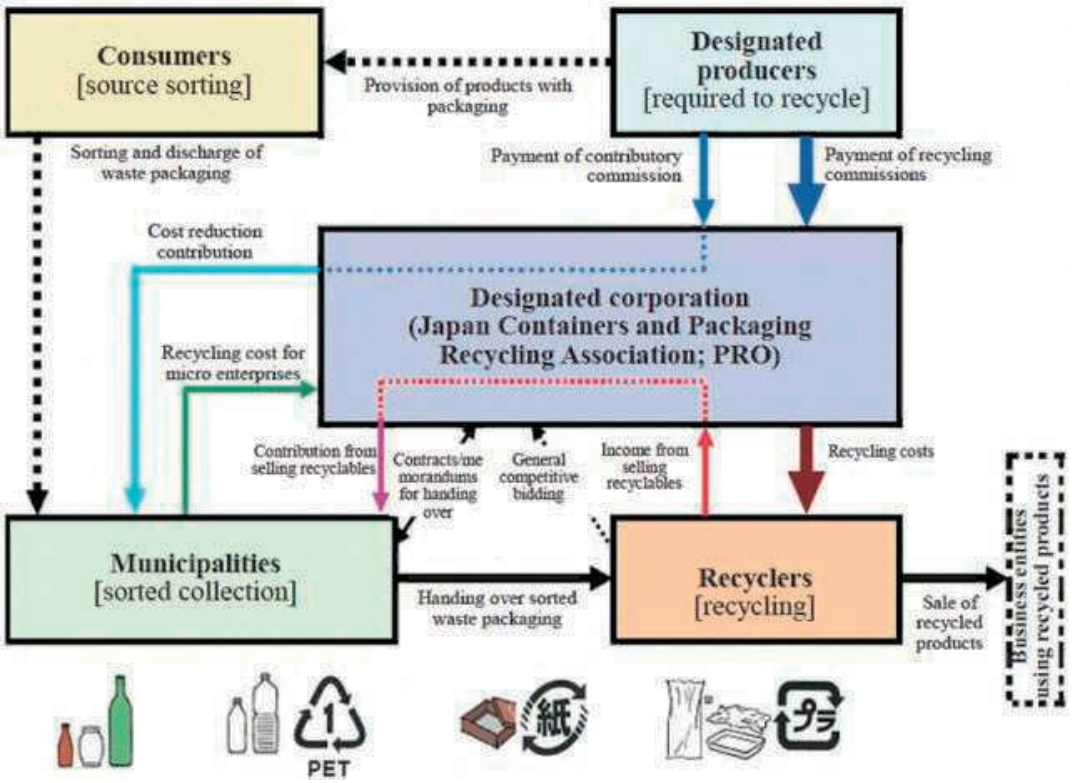
The selection of business operators, setting of rates, and material flow are open to the public in order to ensure the transparency of the system.

Packaging		
Metals	Steel cans	
	Aluminium cans	
Glass bottles	Returnable glass bottles	
Papers	Paper cartons	
	Card boards	
	Other paper containers and packaging	
Plastics	PET bottles	
	Other plastics containers and packaging	

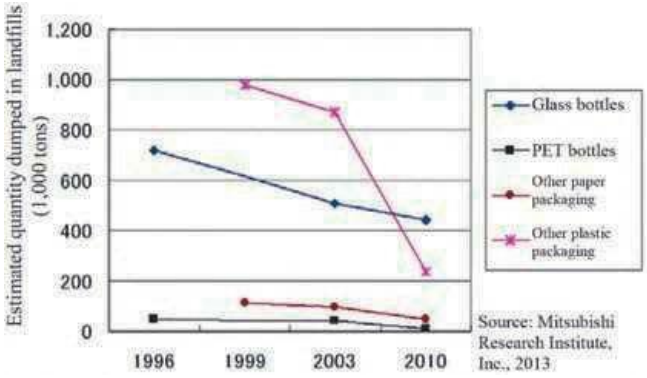
4) Performance of the system

The enforcement of the Containers and Packaging Recycling Law has facilitated the sorted collection and recycling of the four items required to be recycled; consequently, the amount being landfilled is successfully being reduced. Since the revision of the law in 2006, not only has the amount of waste generated been reduced, but also efforts to decrease packaging have been underway by large-scale users. In particular, there has been a drop in the amount of plastic shopping bags consumed domestically. The revised law also led to technological achievements, including reductions in the size and weight of containers and packaging such as PET bottles.

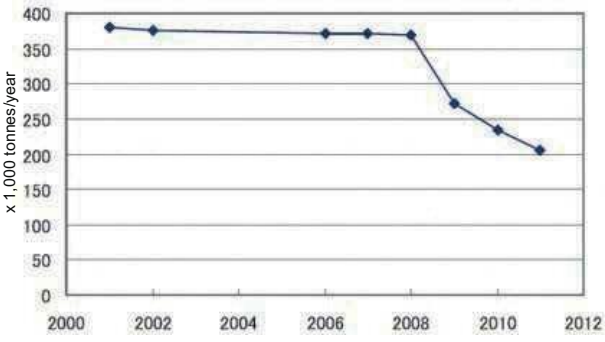
In this way, the Containers and Packaging Recycling Law has greatly contributed to prolonging the use of final disposal sites in line with its original goal, while also advancing the technologies of recycling containers and packaging.



Mechanism of packaging waste recycling based on the Containers and Packaging Recycling



Amount of waste



Amount of plastics bags used

[2] Example of local implementation: Kawasaki

1) Waste sorting in Kawasaki

The city of Kawasaki revised its waste disposal policy from appropriate treatment to resource circulation in response to a rise in public and industry awareness about recycling after Kawasaki declared "a state of emergency in waste management" in 1990. The city has increased the number of items to be sorted for collection and promoted the reduction and recycling of wastes.

With containers and packaging from households accounting for approximately 20 to 30% of the total weight of waste and approximately 60% of the volume, the city began sorting and collecting steel and aluminium cans and glass bottles, later expanding to PET bottles (excluding bottle caps and labels), which are now indispensable in people's daily lives. They were easy to sort and allowed the city to build a framework for recycling items that had until then been discarded as waste. In Japan there is a saying that "mixed items are waste; sorted items are resources." Kawasaki has promoted recycling through sorted waste collection with easy-to-understand catchphrases such as this.

Recently, in response to the enforcement of the Containers and Packaging Recycling Law, the city expanded the range of recycling to paper and plastic material found in society in a wide range of forms.

Kawasaki is one of the few municipalities that collects and recycles the majority of its paper- based waste as mixed paper, including paper containers and packaging and material normally prohibited[2], in parallel with private service systems for the collection and recycling of used paper (newspapers, magazines, corrugated cardboard and milk cartons). This was made possible through paper recycling technology provided by companies located in Kawasaki Eco-Town[3].

Kawasaki also took advantage of the concentration of companies with recycling technology for packaging and plastic bottles at its Kawasaki Eco-Town to establish a desirable waste disposal system that allows almost all recycled waste to be processed within the city.

Group resource collection

The communities that form neighbourhood associations, residents' associations, PTA groups etc., collect recyclable waste such as newspapers, magazines, and corrugated cardboard in cooperation with households and deliver it to waste collectors.

Kawasaki City pays 3 yen per 1kg of collected waste to registered organizations engaged in group resource collection, and 1 yen per 1kg of collected waste to collectors.

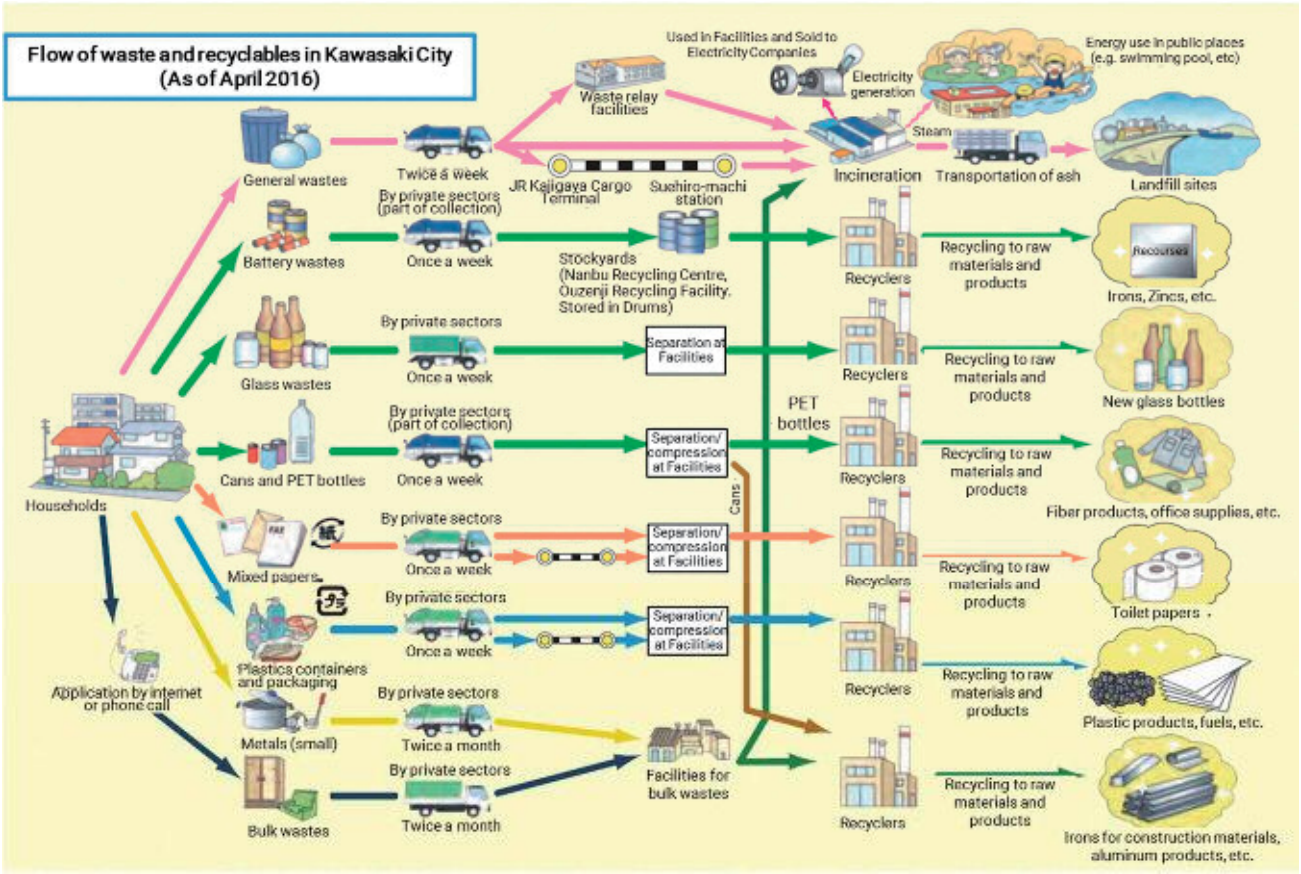
Waste collection vehicle in Kawasaki (Load packer)

Cans and PET bottles

Sorting waste

2 Examples of material that is normally prohibited: Vinyl-coated paper, waterproof paper, envelopes with transparent windows, papers with clips attached, etc

3 Eco Town: Companies located in the Kawasaki Coastal Area have taken the initiative in reducing the environmental load in the region with the aim of creating a sustainable society in which industrial activities are in harmony with the environment.



Flow of treatment for waste and recyclables in Kawasaki

2) Reducing waste through expanding sorted collections

Kawasaki has expanded its sorted waste collection through public relations activities and informational meetings designed to increase understanding and awareness so that each household understands the sorted collection system. It has also run trial programmes in model areas to collect data and review methods for expanding those efforts to the entire city.

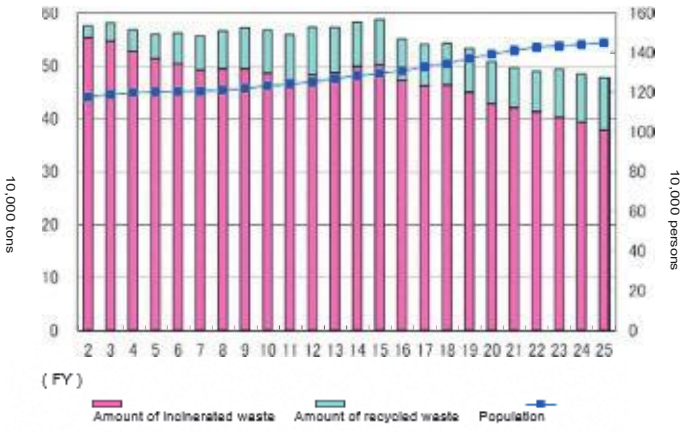
◆ History of collection and treatment of packaging waste in Kawasaki

- Started empty can collection (1977; expanded city-wide in 1998)
- Started used dry cell collection (1984)
- Started empty bottle collection (1991; expanded city-wide in 1999)
- Started collection of small metal articles (1997)
- Started PET bottle collection (1999; expanded city-wide in 2003)
- Started mixed paper collection (2006; expanded city-wide in 2011)
- Started plastic container collection (2011; expanded city-wide in 2013)

The year 2013 marked a major transition for waste disposal administration in Kawasaki. The city changed the frequency at which it collects municipal solid waste (burnable) from three times per week to twice along with the expansion of plastic container and packaging collection citywide.

This change was made with the aim of improving sorted discharge at the household level as well as reducing the generation and discharge of waste in general. Some residents wanted municipal solid waste collection to return to six days a week, as it had been in the past, because of the convenience which made people say Kawasaki was a convenient place to live. However, because of rising awareness about reducing and recycling waste, the city achieved an approximately 5.6% reduction in municipal solid waste, which exceeds the amount of sorted recyclable waste.

As a result, in spite of its increasing population, Kawasaki has reduced the amount of incinerated waste by approximately 130,000 tons over the past decade while maintaining the number of remaining years of use of its final disposal sites at 40. The city also forecasts it will achieve its goal of reducing the amount of incineration per year to 370,000 tons, as laid out in the “Waste Management Basic Plan (The Kawasaki Challenge for 3Rs).”



Changes in population and amount of incinerated and recycled waste in Kawasaki

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3.4 Food waste

[1] National policy

1) Background

In Japan, most food waste in the production and distribution stages and food waste arising from leftover food during the consumption stage (food residue) used to be disposed of in large quantities without being reused as fertilizer or animal feed. At the same time, pressure regarding the remaining capacity at final disposal sites and other issues surrounding waste disposal were becoming increasing severe.

It was in this context that the Food Recycling Law was enacted, with the aims of ensuring the effective use of food-related resources and of reducing the generation of food-related wastes. The Food Recycling Law was promulgated in June 2000 and entered into force in May 2001.

Under the Food Recycling Law, reporting of the volume of food waste, the amount of food reused, and other matters because obligatory for business operators generating large amounts of food waste and the like. It also established a registration system for food recycling business operators and created a system for authorizing reuse business plans (called a "food recycling loop" authorization system) carried out by food waste-generating business operators, food recycling business operators and farmers acting in cooperation.

While the rate of implementation for reuse of food cyclical resources throughout Japan's food industry as a whole steadily improved to 85% in fiscal 2013, the reuse implementation rate declines as one goes further downstream in the food distribution system. In addition, Japan has a high rate of dependency on imports for foodstuffs and production ingredients, and in fiscal 2012, approximately 28 million tons of food waste, including from households, was generated, similarly to years past. Within this, food that was discarded despite still being fit to eat – also known as "food loss" – was estimated at about 6.42 million tons, indicating a need to promote reductions in food waste still further.

2) Formulating a new basic policy for the Food Recycling Law

The Ministers of the Environment and of Agriculture, Forestry and Fisheries consulted respectively with the Central Environment Council and the Council for Food, Agriculture and Rural Areas Policies, asking for the Councils to hold joint deliberations in September 2014 on drafting a basic policy regarding the promotion of the reuse of food cyclical resources. The Councils' report was released in April 2015.

A new basic policy for the Food Recycling Law, based on that report, was promulgated on July 31, 2015.

3) Food reuse targets for food-related business operators

The Food Recycling Law brings together "controlling the amount of food waste and reducing the amount" and "the reuse and thermal recovery of food cyclical resources" to promote measures comprehensively under a definition of "the reuse of food cyclical resources."

Targets for the rate of implementing food reuse by food-related business operators have been set at 95% among food manufacturers overall, 70% for food wholesalers overall, 55% for food retailers overall, and 50% for food service providers overall for fiscal 2019, with each target representing an improvement over the current level.

In addition, it calls on individual business operators to exceed the implementation rate target (the rate of implementing the standard) for the current fiscal year established for their own business grouping, in order to attain the target for each business grouping as a whole.

As for reducing food loss in particular, it calls for various related parties including the national government, local governments, food-related business operators, and consumers to cooperate to develop a national movement to reduce food loss throughout the food chain as a whole, from food manufacturing to consumption, and work to reduce food loss.

Food-related business operator	Rate of implementing food reuse: targets to be met by fiscal 2019
Food manufacturers	**95%**
Food wholesalers	**70%**
Food retailers	**55%**
Food service providers	**50%**

4) Performance of the system

The disposal amount of food waste and the recycling implementation rate in recent years are shown in the following chart:

The disposal amount of food waste has been on a downward trend every year; the recycling implementation rate has also improved. However, since the target level has not been achieved in the

fields of food wholesale and food service providers, further efforts need to be made.

Food waste disposal amounts and recycling implementation rates by business type, FY2008-2014

[2] Example of local implementation: Kawasaki

1) Guidance to business operators discharging large quantities of business-related general waste

Kawasaki designates business operators discharging an average of 100 kg or more of business-related general waste per day, or an average of 3 or more tons of business-related waste per month, as “primary business operators.” Business operators discharging an average of 30 kg or more and less than 100 kg of business-related general waste per day, or an average of 900 kg or more and less than 3 tons of business-related waste per month, are designated as “secondary business operators.” Both designations of operators are required to create and submit plans for waste reduction.

2) Providing information on the Food Recycling Law and implementing model projects

Kawasaki conducts hearings and on-site inspections of both primary and secondary business operators based on their plans for waste reduction and provides information on the Food Recycling Act and other matters. The city also introduces outstanding approaches by business operators on its website and holds informational meetings. As a part of its activities, the city also works in cooperation with food waste disposers and privately-operated plants to recycle food residue from its elementary school lunch programme for use as animal feed, fertilizer and compost.

Informational meeting

3) Food Waste Recycling Plan

Kawasaki held discussions from November 2005 to create a recycling plan. The discussions included citizens, individuals involved in agriculture as well as those with relevant knowledge and experience, business operators and city officials. In February 2007, the city established its Food Waste Recycling Plan based on the reports from the discussions, covering until fiscal 2015. This plan encourages individual households and residents’ organizations to engage in small-scale cyclical use of food waste.

4) Food waste reduction by the city government and residents

The Food Waste Recycling Plan includes grants to residents for the purchase of food waste disposal appliances as well as to organizations involved in food waste recycling activities utilizing farmland and public gardens in order to encourage individual households and regions to reduce and recycle food waste, which accounted for approximately 30% of household waste when the plan was adopted.

In addition to these grants, the city recognizes residents having knowledge and experience in food waste recycling as “Kawasaki Food Waste Recycling Leaders” to provide lectures at meetings organized by ward offices or individuals and various organizations.

Kawasaki organizes networking events among resident groups working on these activities to deepen their relationships and expand their activities. It also works in cooperation with universities in the city and local residents to seek new approaches to producing food waste-derived fertilizer.

Giving advice to residents at a ward

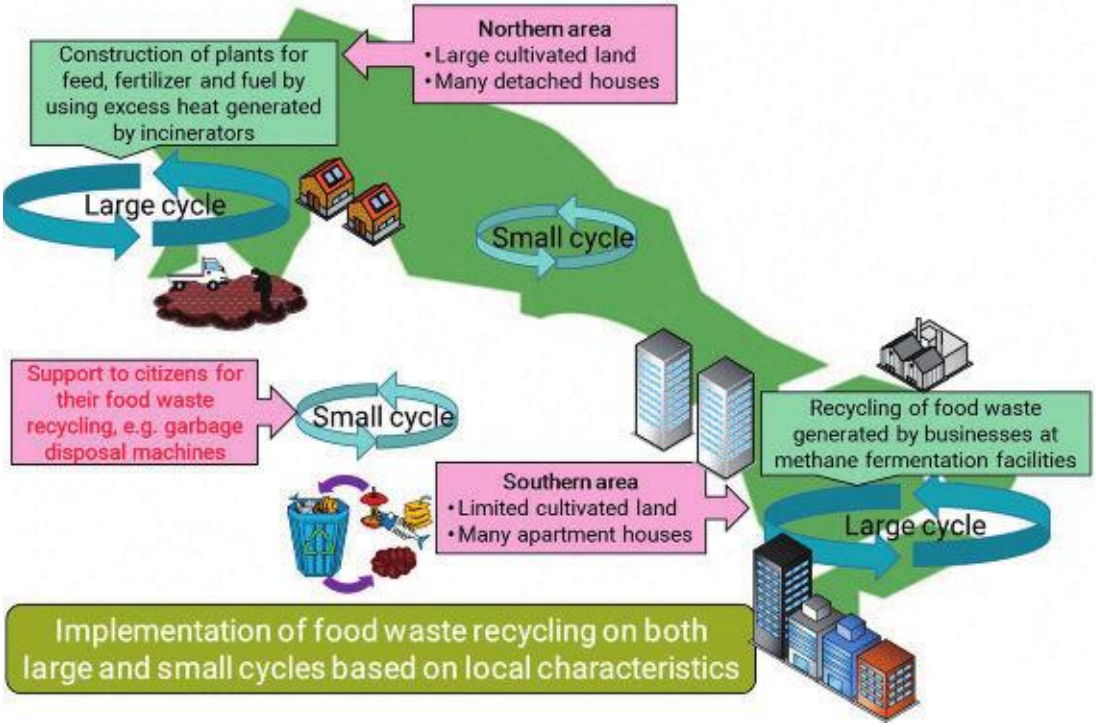

Image of Kawasaki's Food Waste Recycling

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3.5 E-waste

[1] National policy

1) Background

End-of-life home appliances discarded as waste by general households used to be crushed, after which a portion of the metals contained were recovered. Roughly one-half of the original volume was ultimately landfilled. The Law for Recycling Designated Home Appliances (hereinafter, the Home Appliance Recycling Law) entered into force in April 2001 in response to the situation that end-of-life home appliances contain a large amount of steel, glass, and other useful resources, and the capacity of final disposal sites had been becoming a pressing situation; moreover, it would help bring about a society with sound material cycles by reducing the amount of waste while making adequate use of recyclable resources. In addition, the Law on the Promotion of Recycling of Small Waste Electrical and Electronic Equipment (hereinafter the Small Electrical and Electronic Equipment Recycling Law) entered into force in April 2013, advancing the creation of a system for recovering cell phones, digital cameras, and other small electrical and electronic equipment outside the scope of the Home Appliance Recycling Law.

2) Objective

The Home Appliance Recycling Law places an obligation on manufacturers to recycle the four specified home appliances into products or raw materials. This requirement encourages manufacturers to design products that are easy to recycle.

In addition, the Small Electrical and Electronic Equipment Recycling Law aims at the effective use of resources by having small waste electrical and electronic equipment, which contains significant amounts of steel, copper, gold, silver and other useful metals, recovered and recycled efficiently and in a broad-based manner.

3) Roles of the parties concerned

The roles of the parties concerned in the Home Appliance Recycling Law and the Small Electrical and Electronic Equipment Recycling Law are as follows.

	Home Appliance Recycling Law	Small Electrical and Electronic Equipment Recycling Law
Consumers	Properly deliver items Cover costs related to collection and recycling	Participate in sorted collection
Local governments	Implement necessary measures to promote collection, transport, and recycling	Collect items Transfer items to authorized business operators
Retailers	Collect items from users Transfer items to manufacturers	Cooperate in proper disposal
Manufacturers	Receive items from retailers Recycle items	Cooperate in recycling
National government	Research, education, publicity, etc.	Research, education, publicity, etc.

4) Characteristics of the recycling system

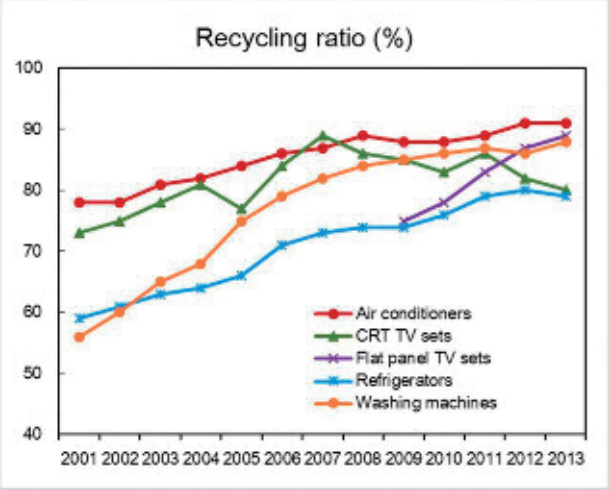
The following overviews the Home Appliance Recycling Law and the Small Electrical and Electronic Equipment Recycling Law.

	Home Appliance Recycling Act	Small Electrical and Electronic Equipment Recycling Act
Disposal coverage	Households and companies	Households and companies
Covered items	TV sets; washing machines and clothes dryers; air conditioners; refrigerators and freezers	Most electronic items such as cellphones, digital cameras and game machines, other than the four items specified at left
Responsibility for recovery	Manufacturers	
Method for collection	Electronics retail stores	Collection boxes, etc.
Responsibility for recycling	Manufacturers	
Cost burden	Consumers	Varies according to collection method

5) Performance of the system

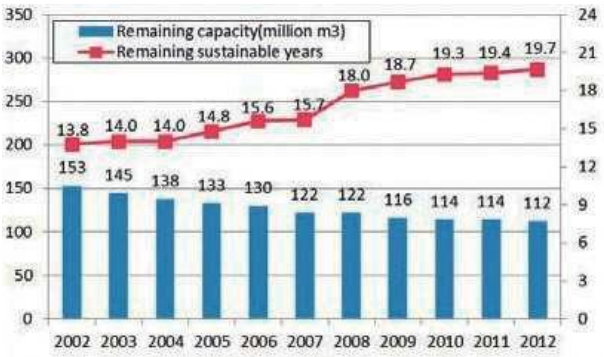
Under the Home Appliance Recycling Law, 10.86 million home electric appliances were collected and 11.48 million recycled in FY2014. The chart below shows the recycling rate by item for the four types of home electric appliances has already reached the required legal standard. In terms of the Small Electrical and Electronic Equipment Recycling Law, about 50,000 tons of small electrical and electronic equipment were collected in FY2014. Further activities have been implemented toward achieving the annual collection target of 140,000 tons in FY2015.

The remaining sustainable years of final disposal sites for municipal waste in Japan are increasing yearly, and the Home Appliance Recycling Law has played a significant role in reducing final disposal volume.



Recycling products

FY	-2008	2009-	2015-
Air conditioners	60%-	70%-	80%-
CRT TV sets	55%-	55%-	55%-
Flat panel TV sets	-	50%-	74%-
Refrigerators	50%-	60%-	70%-
Washing machines	50%-	65%-	82%-



Remaining capacity of landfill sites and its trend

[2] Example of local implementation: Kawasaki

1) Unique collection system through the Home Appliance Recycling Council

The Home Appliance Recycling Law requires home appliance retailers to collect four kinds of used home appliances (air conditioners, refrigerators and freezers, TVs, and washers and dryers) which they sold, or which have been used by purchasers who are buying new ones from them, and home appliance manufacturers are required to recycle the appliances accepted by retailers. Home appliance retailers in Kawasaki established the Kawasaki City Home Appliance Recycling Council to promote the collection and recycling of home appliances in cooperation with the city through the “Kawasaki Recycling System.”

Although not required to do so by law, under the Kawasaki Recycling System, retailers who are Council members accept these four kinds of appliances from residents regardless of where they were originally purchased, and Kawasaki provides temporary storage for the collected home appliances. The home appliances collected by cooperating retailers are stored at a temporary storage facility, and agencies entrusted by the Council transport them to sites designated by each manufacturer for recycling.

Allowing residents to take their home appliances from the four categories stipulated by law to neighbourhood home appliance retailers not only encourages consumers to recycle, but it gives appliance retailers the opportunity to attract new customers and costs Kawasaki less money than it would to recycle the home appliances at municipal facilities. Increasing the number of Council members is also expected to help in preventing illegal disposal. Kawasaki utilizes the market mechanism in this framework to promote home appliance recycling.

2) New approaches to recycling small electrical and electronic equipment

The Small Electrical and Electronic Equipment Recycling Law aims to encourage the efficient collection of items for recycling while also obliging all relevant parties to assume some responsibilities. The targets are varied and the methods of collection are diverse. The law gives each municipality the freedom to decide how they will implement the system to collect and recycle the items.

Kawasaki worked to gather information on efficient recycling systems from the time the national government was discussing the potential law. Once the law was passed in April 2013, the city moved forward with early implementation of a system that would reduce the burden on residents and prevent

confusion about the changes in the collection system.

In addition, through the verification project implemented by the Ministry of the Environment to promote small electrical and electronic equipment recycling by municipalities, Kawasaki was able to utilize national funding for the initial investment to begin collection at base collection points and events from October 2014.

3) Box collection

The city has installed collection boxes for small electrical and electronic equipment at public facilities to promote collection directly from residents at these base collection points.

Target articles are those specified under government guidelines (articles to be recycled considering their value as resources and ease of sorting), such as mobile phones and digital cameras, which are less than 30 cm at their longest and therefore easily inserted into collection boxes, whose deposit slots measure 30 cm by 15 cm.

Collection box for small home appliances

Examples of articles

4) Collection through events

The city sets up collection boxes at public events and distributes leaflets to encourage the recycling of small electrical and electronic equipment among residents.

Collection at events

Punching a hole in a mobile phone

At the events, the city also punches holes in collected mobile phones to show residents that it protects personal information when handling collected devices.

5) Pick-up collection

Through the collection of small metal articles and oversized waste, Kawasaki has already promoted the recycling of metal resources such as steel, aluminium and copper, resources contained in many kinds of small electrical and electronic equipment. In order to promote the efficient utilization of more resources such as precious and rare metals, the city has considered pick-up collection to sort such resources through the existing recycling system.

Pick-up collection does not require changes in the existing waste discharge method for residents, and therefore does not impose new burdens on the public. Moreover, the sorting conducted during and after transport to waste collection facilities has not changed significantly from the existing method. As a result, the city is now engaged in pick-up collection without any increases in workload or costs.

Pick-up collection

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3.6 Construction and demolition waste

[1] National policy

1) Background

Construction waste generated by construction work accounted for 20% of industrial waste and a large percentage of the contents of final disposal sites as well; the greatest part of illegally dumped waste was also construction waste. Moreover, with buildings constructed in the high-economic growth period of Japan needing to be renovated, further increases in construction waste were expected, and a prompt response to all these issues was required. It was in this context that the Law on Recycling Construction-Related Materials (the Construction Material Recycling Law) was enacted and promulgated in May 2000 and came into force in May 2002.

2) Objective

The Construction Material Recycling Law requires separate demolition and recycling for certain construction waste, establishes a registration system for wrecking companies and aims to promote recycling and the utilization of recycled materials.

3) Roles of the parties concerned

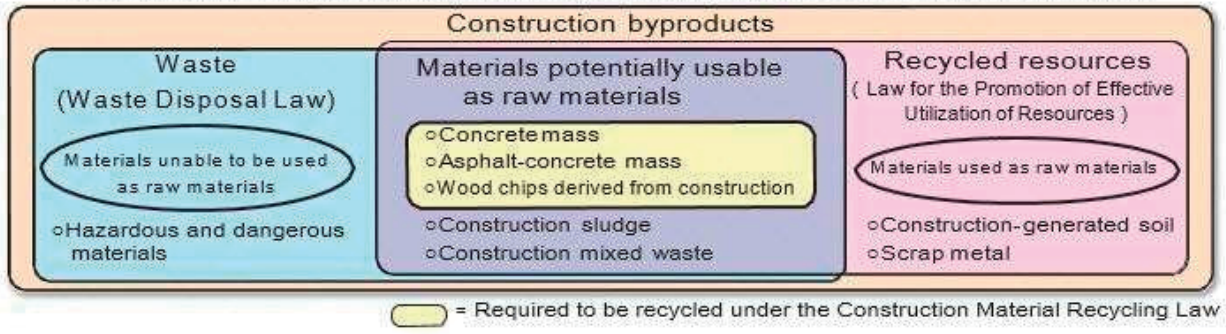
The roles of the parties concerned in the Construction Material Recycling Law are as follows:

Entity ordering the construction	Submit notification documents
Construction vendor	Conduct separate demolition; ensure recycling; provide explanations/reports to entity ordering the construction
Local governments	Approval of schemes for the sorted dismantling of construction materials related to the notification documents; change orders; on-the-spot inspections

4) Characteristics of the recycling system

Construction byproducts are divided into three categories: waste that is not able to be recycled; recycled resources to be used as raw materials; and materials with the potential to be used as raw materials, which fall between waste and recycled resources (see the graphic below). Wrecking companies are required to recycle concrete mass, asphalt-concrete mass and wood chips derived from construction.

Relationship among construction byproducts, recyclable resources and waste



Relationship among construction byproducts, recyclable resources and waste

Covered items		Target for FY2012 (under the 2008 Promotion Plan)	Actual results for FY2012	Goals for FY2018	
Asphalt-concrete mass	Recycle rate	Over 98%	99.50%	Over 99%	Maintain efforts so that the recycle rate does not decline
Concrete mass	Recycle rate	Over 98%	99.30%	Over 99%	
Wood chips derived from construction	Recycle/ reduction rate	Over 95%	94.40%	Over 95%	Continue to work to achieve target
Construction sludge	Recycle/ reduction rate	Over 82%	85.00%	Over 90%	Set a higher numerical target
Construction mixed waste	Disposal rate*1	--	3.90%	Below 3.5%	Change the indicator from the disposal volume to the disposal rate of construction mixed waste*1 and the recycle/reduction rate
	Recycle/ reduction rate	--	58.20%	Over 60%	
Total construction waste	Recycle/ reduction rate	Over 94%	96.00%	Over 96%	Set a higher numerical target
Construction-generated soil	Effective utilization rate of construction-generated soil*3	--	--	Over 80%	Change the indicator from the utilization rate of construction-generated soil from earth and sand*2 to the effective utilization rate of construction-generated soil*3

Targets in the 2014 Construction Recycling Promotion Plan formulated by the Ministry of Land, Infrastructure, Transport and Tourism (MLIT), Source: Based on the 2014 Construction Recycling Promotion Plan, MLIT

*1Ratio of the disposal volume of construction mixed waste to the disposal volume of total construction waste
*2Ratio of the effective utilization in construction work through on-site utilization and utilization between construction projects to the volume of earth and sand utilized
*3Ratio of the effective utilization through on-site utilization and utilization between construction projects, including reconstruction of quarry sites that are properly filled and acceptance of farmland to the disposal volume of construction

5) Performance of the system

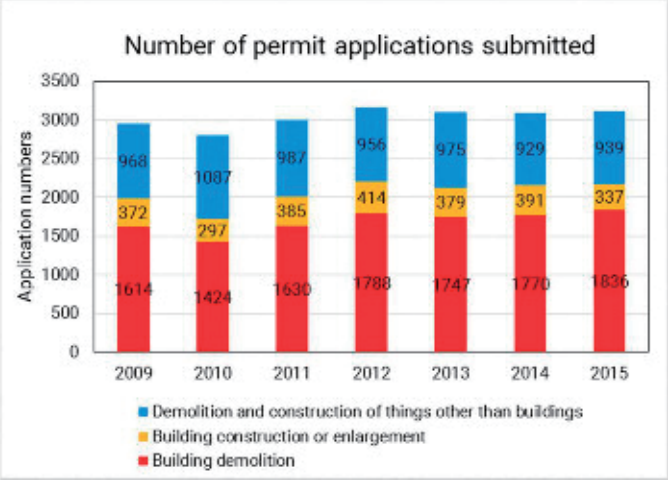
The promotion of recycling in construction contributed to attaining a high recycling rate in 2012, as shown in the table above. Illegal dumping of construction waste has also been largely reduced compared to the situation prior to enforcement.

[2] Example of local implementation: Kawasaki

1) Applications for permits under the Construction Material Recycling Law

The Construction Material Recycling Law requires permits for different types of construction work, which can be categorized as building demolition, building construction or enlargement, and demolition and construction of things other than buildings. The graph below shows changes in the number of permit applications submitted (including notifications) in these categories.

Kawasaki has worked since 2004 to deter construction work undertaken outside the permit process. Once an application submitted by a construction contractor is accepted by the city, the city issues a verification sticker, which the contractor affixes in the lower right corner of the plate posted at the site indicating the construction license or the demolition operator registration.

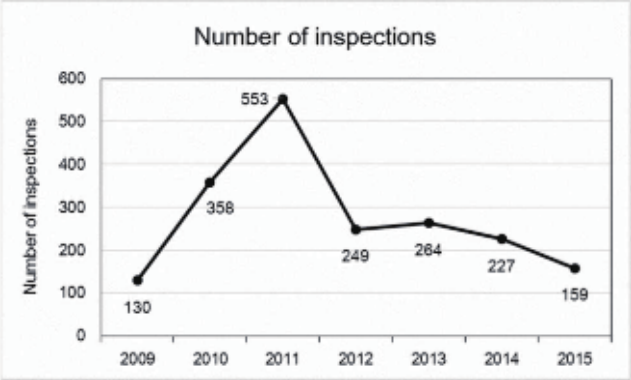


Number of permit applications submitted

Placement of the verification sticker

2) Inspections

Kawasaki conducts periodic on-site inspections to promote appropriate demolition work in accordance with laws and regulations in cooperation with departments in charge of environmental measures and waste management and national institutes in charge of measures to prevent the impairment of health. The number of these inspections are shown in the graph below.



Number of inspection in FY 2009-2015

Kawasaki increased the number of on-site inspections in FY2010 and FY2011 in response to August 2010 newspaper reports which claimed some recycled construction waste that included asbestos was being used.

3) Recycling

Kawasaki created the Kawasaki City Recycling Promotion Plan targeting the construction of public works in the city in March 2004 and set target recycling rates for specific construction waste to be achieved in FY2005 and FY2010 to promote recycling in response to the full enforcement of the Construction Material Recycling Law. These targets were achieved on the whole.

In March 2010, the city created its next Kawasaki Construction Material Recycling Promotion Plan and set target recycling rates for specific construction materials to be achieved in FY2012 and FY2015. As shown in the table below, the target recycling rates have been achieved by and large for Kawasaki's public works projects.

Implementation status of the recycling of construction and demolition waste

	FY	2008	2009	2010	2011	2012	2013	2014
Recycling rate	Asphalt concrete blocks	99.2%	98.9%	99.4%	99.4%	99.2%	99.2%	99.9%
	Concrete blocks	95.9%	98.4%	99.2%	98.1%	99.6%	99.5%	99.1%
	Timber blocks	80.4%	86.4%	96.9%	96.7%	97.3%	92.4%	93.2%
Target recycling	Asphalt concrete blocks	> 99%			> 99%			
	Concrete blocks	> 99%			> 99%			
	Timber blocks	65%			79%		81%	
		The Kawasaki City Recycling Promotion Plan (March 2004)						
					The Kawasaki City Recycling Promotion Plan (March 2010)			

Recycling rate:
Asphalt concrete blocks, concrete blocks: (reuse volume + recycled volume) / emissions
Timber blocks: (reuse volume + recycled volume + amount of heat recovery) / emissions

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3.7 End-of-life vehicles

[1] National policy

1) Background

Even before the law on end-of-life vehicles entered into force, within Japan's recycling system for vehicles there already existed a disposal route that made use of the market for the recovery of useful parts by dismantlers and the recycling of ferrous and nonferrous metals and other materials, made possible through shredding and sorting operations conducted by relevant operators.

In April 1995, it was made obligatory to dispose of automobile shredder residue (the shredded remains of a vehicle from which parts, materials and other things of value have already been recovered; hereinafter abbreviated as ASR) in leachate-controlled landfills. Volatile fluctuations in the price of scrap iron, together with the pressing nature of final disposal sites' limited remaining capacity and the rapid surge in final disposal costs that resulted, led to the market-based recycling system that was in place until that time failing to function properly. There was at the same time growing concern that illegal dumping and inappropriate disposal would increase.

In light of this situation, the Law for the Recycling of End-of-Life Vehicles (hereinafter, the End-of-life Vehicle Recycling Law) was enacted and promulgated in July 2002, entering into force in January 2005.

2) Policy objective and an evaluation of the system after its entry into force

Under the new system based on the End-of-life Vehicle Recycling Law, three items whose disposal is particularly costly (fluorocarbons, airbags, and ASR) are separated off from the existing disposal route. Vehicle manufacturers accept these items and recycle them after relevant business operators conduct proper processing, with the user bearing their recycling costs. The goal has been to create a situation in which used vehicles on the whole undergo distribution as valuables and also to have the market-based recycling system that was already in place function well.

As for how the charges are paid by the user, the end user deposits the recycling fees in advance, at the time a new vehicle is purchased. By having the owner cover these fees, this system reduces in advance the risk of illegal dumping. In addition, the recycling fees that have been deposited are administered and used collectively by a designated deposit management entity until the vehicle reaches the end of its life. The recycling fees deposited at the time the vehicle was purchased are appropriated to its recycling costs. The system also serves as a means for responding to the risk of bankruptcy by vehicle manufacturers.

The overall legal structure has been evaluated as functioning well on the whole, as goals for eliminating illegal dumping, reliably recycling airbags, and reliably destroying fluorocarbons have been met.

The proper execution of this system has dramatically eased the problematic limited remaining capacity of final disposal sites attributable to ASR, and this was one of the initial goals upon enactment of the law. It has also drastically reduced the number of remaining vehicles, including those on remote or small islands. The situation on these islands was a particularly significant issue at the time the law was enacted. At the end of September 2004 just before this law entered into force, there were just over 218,000 vehicles which had been dumped illegally or stored improperly; by March 2015, this figure had dropped to a little over 7,200 vehicles.

Although the number of new cases of illegally dumped and improperly stored vehicles has been on a downward trend, a certain number of cases continue to emerge, requiring ongoing measures going forward.

In addition, the End-of-life Vehicle Recycling Law has made it easier to monitor the recycling of the three designated items (fluorocarbons, airbags, and ASR), and in fact recycling has been increasing dramatically. A goal was set to have 95% of end-of-life vehicles overall undergo indirectly either material or thermal recycling, leveraging the goal of recycling 70% of ASR that has accompanied vehicle manufacturers carrying out ASR recycling.

The recycling of end-of-life vehicles overall had been at roughly 83% when the vehicle recycling system was introduced but has now reached a level of almost 100%. Moreover, with regard to the state of recycling fee deposits and the state of recycling end-of-life vehicles, it has become possible to manage information on individual vehicles through linking in to motor vehicle inspection information, resulting in high evaluations of Japan's system even in comparison to European systems.

3) Performance of the system

The accompanying table shows the ASR recycling rates that have been achieved. The rate for recycling ASR has attained a level greatly surpassing the 70% set as the standard for FY2015 and beyond. The percentage undergoing "whole recycling" had been declining but has now increased somewhat. The overall recycling rate has been rising, reaching 97% in fiscal 2014.

	Before entry into force		After entry into force				
Month/year	09/2004	03/2005	03/2008	03/2009	03/2010	03/2011	03/2012
Number of vehicles	218,359	140,436	22,280	14,983	11,465	9,635	8,667

State of illegal dumping and inappropriate storage of vehicles

	FY 2005 (Law enters into force)	FY 2011	FY 2012	FY 2013	FY 2014
Collected weight of ASR (t) (a) Number of vehicles collected Collected weight of ASR per vehicle (kg/vehicle)	427,508 (2,417,342) (176.9)	498,124 (2,689,445) (185.2)	598,533 (3,194,936) (187.3)	590,624 (3,174,446) (186.1)	575,046 (3,101,651) (185.4)
Weight received at recycling facilities (t)	289,519	493,393	593,944	587,388	575,046
Weight of residue discharged from recycling facilities (t)	40,588	30,056	25,978	17,574	16,908
Weight recycled (t) (c)	248,931	463,337	567,966	569,814	558,138
ASR equivalent weight received for authorized “whole recycling”* (t) (b) (Number of vehicles subjected to “whole recycling”)	52,955 (307,167)	25,869 (139,254)	27,329 (146,453)	30,403 (163,452)	32,121 (175,563)
ASR equivalent weight received at authorized “whole recycling”* facilities (t)	49,126	25,869	27,329	30,403	32,121
Weight of residue discharged from “whole recycling” facilities (t)	928	261	321	323	441
Weight recycled (t) (d)	48,199	25,608	27,008	30,080	31,680
Weight of vehicles subjected to “whole recycling” (weight basis) (b/a+b)	11.0%	4.9%	4.4%	4.9%	5.3%
ASR recycling rate (average among all obligated parties) ((c + d)/(a + b))	61.8%	93.3%	95.1%	96.6%	97.1%

Treatment status and recycling rate of shredder dust

*Of the recycling techniques that elaborately dismantle end-of-life vehicles and melt down the vehicle in its entirety as steel materials and do not generate ASR, “whole recycling” is a technique that is recognized in article 31 of the End-of-life Vehicle Recycling Law.

4) Registration and licensing of business operators under the End-of-life Vehicle Recycling Law

Under the End-of-life Vehicle Recycling Law, local public entities register business operators that collect end-of-life vehicles and recover fluorocarbons. They also certify business operators involved in the dismantling and shredding of vehicles. Licenses are valid for five years.

Number of registered operators

1: End-of-life vehicle collectors	35,814
2: Fluorocarbon recovery	11,455

Number of licenses

1: Dismantlers	4,928
2: Shredding and sorting	1,119
(Pressing and shearing only)	1,003

(as of the end of 2014)

[2] Example of local implementation: Kawasaki

1) Screening and standards for registration and licensing

Kawasaki has established requirements for registration and licensing to ensure fair and efficient administration. For the convenience of business operators, the city also created guidelines for the application process and related business operations.

Because of the significant potential for impact on the surrounding environment, dismantling, shredding and crushing operators are required to submit business plans for preliminary screening before applying for registration and licensing.

2) On-site inspections and reporting

- **On-site inspections**

Following registration or licensing, Kawasaki conducts periodic on-site inspections to confirm compliance with legal requirements (facility standards, applicant capabilities, operations not provided for in the application and environmental protection-related measures).

- **Collection of reports**

Under the Automobile Recycling Law, the city requires operators to report inappropriate handling or accidents.

3) Administrative disposition

Kawasaki has rescinded authorization for operations that fail to meet requirements under the Automobile Recycling Law. Instances include one end-of-life vehicle collector, one fluorocarbon recovery operator and two dismantlers.

4) Occurrences of, and responses to, reports of delays when reporting on movement of end-of-life vehicles

Telephone calls are made to business operators to urge them along in cases of delays.

In cases of delays due to input errors and other such circumstances, a check of the situation is performed on site and efforts are made to ensure appropriate reports on movement.

1: Abandoned automobiles and response measures

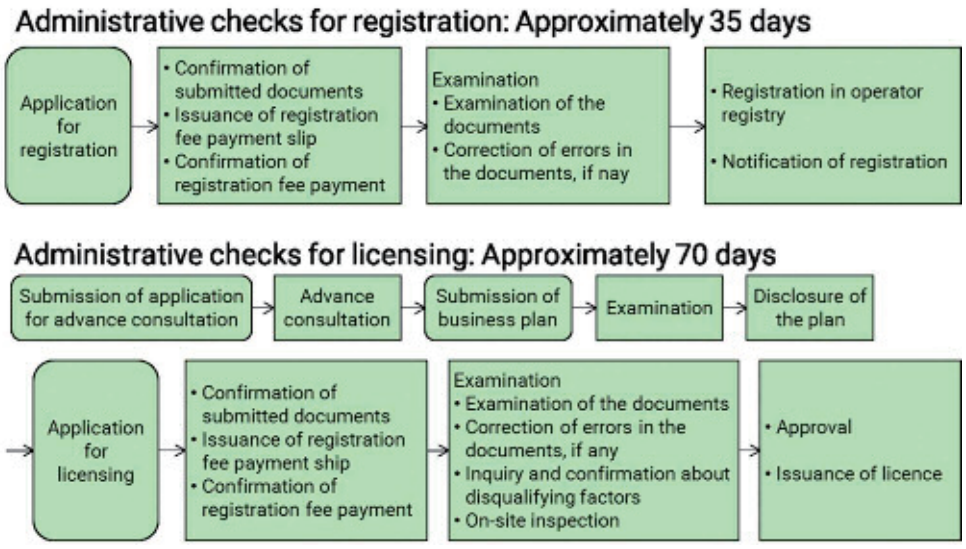
- Although there has been some fluctuation in the number of abandoned automobiles, since the law came into effect, there has been a gradual decline.
- Automobiles abandoned on roads are removed after police classification as discarded articles.
- For automobiles abandoned in places other than roads, individual facility managers confirm ownership and classify abandoned automobiles on their premises as discarded articles.

2: Measures against illegal disposal

- Setup of barricades
- Reinforcement of patrols

3: Issues undermining measures against illegal disposal

- Due to a lack of temporary storage, it is difficult to respond to petitions against time- consuming waste removal (on roads).
- It is difficult to confirm ownership and classify automobiles as waste (in places other than roads).
- Procedures for entrusting removal work, including the selection of operators, are complicated.



Processes for registration and licensing based on the law on end-of-life vehicles

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Chapter 4 Lessons learned

This report highlights important lessons for countries now on the path of economic growth. Below are some essential lessons for developing countries as they devise their own roadmaps for sustainable development based on the specific circumstances they face within their respective countries and cities.

Approach

1. **Prevention is better than cure**: Rapid economic growth, urbanization and industrialization in Japan during the 1950s to 1970s resulted in substantially greater amounts of generated waste. Due to inappropriate waste management, not only did waste dumps impart damage to human health but also industrial waste heavily contaminated natural resources such as on Teshima Island, where industrial waste was dumped. Developing countries can take away the lesson that proactive measures are far better than reactive measures in the context of preventing irreversible impacts upon human health and the environment.

2. **Holistic approach**: The "silo" approach of treating solid waste with as many as 1,854 incineration facilities (in contrast to 54 facilities in Germany, the country with the second highest number after Japan) caused multiple public health and environmental problems, leading to a "garbage war" among municipalities. To avoid such as situation, it is necessary to take a holistic approach that addresses waste in its various forms (as solid waste, liquid waste, gaseous emissions and soil contamination). This should be accompanied by a fully-fledged concept integrating all aspects of waste management (3Rs, waste to energy, application of environmentally sound technologies, etc.).

3. **Setting the vision and mission**: The national government can effectively set a vision. In Japan, once the vision of a "Sound Material-Cycle Society for social and economic reform" was established, legislation was adopted on various concepts, including the 3Rs (reduce, reuse and recycle) and extended producer responsibility (EPR). The mission was set by local governments, such as the city of Kawasaki, to maintain a healthy and comfortable living environment for residents.

   The vision was supported by a growing awareness that industries as well as the residents themselves are responsible for the air and water pollution that accompanied economic activities. Preventing and reducing waste therefore came to be an integral part of the mindset that helped Japan to incorporate these concepts into its legal framework. The targets and mission grounded in this fully-fledged waste management concept set the tone to improve the waste management system.

4. **Awareness-raising**: The governments, particularly local governments including the Kawasaki city government, prioritized awareness-raising for the community and for industries regarding the health and environmental impacts of wastes (solid waste, liquid waste and gaseous emissions). This led to voluntary actions by industries and the community prior to policy making and enforcement.

Policies & their enforcement

5. **Putting policies in place**: The legislative framework is important for an effective waste management system and for policies. Under a law that serves as the main framework, related laws should be improved or revised according to the changing realities on the ground, regarding the amounts of waste generated and changes in the waste composition, such as an increase in the proportion of hazardous waste. Policies have been found to be more effective when accompanied by an incentive scheme. An example of such an incentive is a subsidy associated with specified or prioritized policy areas.

6. **Enforcement**: Simply framing the policies is not enough; it is also essential to put the policies to work under effective enforcement. The close collaboration between Japan's national and local governments is critical. An example in the case of Kawasaki is that the city builds up cooperative relations with the national government when implementing its policies.

7. **Securing budget allocations**: Initial funding from the national government to local governments is a driver for proper, sustainable waste management. In Japan, the national government provided financial support to build facilities (for instance, subsidies for infrastructure and low interest finance and special tax measures for

industrial waste management), along with technical guidance to operate and maintain those facilities in the most cost effective manner. Local governments became self-sufficient later, due to the growth of the local economies and increases in tax revenue from economic activities. Funding requirements and priorities will vary from city to city, based on local financial and technical capacity.

8. **Licensing and monitoring**: Japan places the responsibility for disposing of industrial waste on business operators. Illegal dumping occurs because some business operators consider disposal to be an overhead expense that does not directly contribute to profits. With the revision of previous laws, local governments in Japan now implement an industrial waste management licensing system to monitor the management of waste by businesses from generation to final disposal. In addition, local governments are promoting systems to cultivate the responsibility and ability of business operators through implementation of an approval system for business start-ups, installation of industrial waste processing facilities by the waste management service providers, penalties for non-compliance and so on. Regulations and restrictions developed to monitor these activities have led to measurable results.

9. **Financial and technical support**: The national government started a comprehensive support system for local governments to build and operate waste treatment facilities. The local governments through the support from the national government established eco towns to provide financial and technical support for recycling and "closing the loop," based on the 3R (reduce, reuse and recycle) approach.

Data & knowledge management

10. **Envisioning the future**: The changing landscape of waste, such as the emergence of e-waste, packaging waste, food waste, construction waste and end- of-life vehicles, was envisioned early on and proper policies and infrastructure were developed to manage these specific waste streams. This is an important lesson for developing countries as they develop waste data with projections into the future, as such data must be taken into account when developing an effective waste management system.

11. **System for recycling**: Japan and its cities such as Kawasaki clearly demonstrate that recycling works well when there is full-fledged support from the citizens, businesses, city government and national government. Source segregation is key, and this requires effective education and awareness-raising. Developing countries need to introduce long-term capacity building and awareness-raising regarding waste reduction and recycling.

Partnerships

12. **Working together - national and local governments:** The national government in Japan provides the legislative framework along with active support to local governments. This support is extensive, ranging from annual surveys on waste and waste management for identifying and filling any gaps, the promotion of the 3Rs through financial and technical support, financing and tax measures, and exchanges of views for continual improvement. The local governments work very closely with stakeholders including communities, industries, and service providers to raise awareness, strengthen their capacity and monitor waste management. In developing countries, cooperation between national and local governments is typically a major challenge that needs to be overcome.

13. **Private sector participation**: An effective and efficient waste management system has come about through active private sector participation in Japan and its cities such as Kawasaki. The private sector, including the producers of various appliances and automobiles, are responsible for collecting back and recycling end-of-life appliances and vehicles under EPR. Private entities producing industrial and other wastes are responsible for managing their waste and the government provides an enabling environment. Lastly, the private sector is engaged in waste management services including collection and transportation, recycling, treatment and final disposal of waste. The private sector not only brings investment but also improves management efficiency. In developing countries, the private sector could be encouraged to be part of the waste management system. In cities or countries where the private sector is not yet well-structured, then a government- run waste management system run under private sector principles could be considered.

These lessons above could be useful for developing countries and their cities as they relate these experiences to their local situations and identify important areas for knowledge transfer from developed countries and their cities such as Japan and Kawasaki. The knowledge transfer could be in terms of policies, enforcement, techniques and

technologies, education, national and local government cooperation, private sector participation and stakeholder involvement. International organizations such as UN Environment and institutions such as IGES can facilitate knowledge transfer and help developing countries to advance their national and city-level waste management strategies to improve waste management.