

PM2008:009

Promotion of Resource Efficiency in Japan

– through 3R (Reduce, Reuse and Recycle) policies

Izumi Tanaka

Promotion of Resource Efficiency in Japan

- through 3R (Reduce, Reuse and Recycle) policies

Izumi Tanaka

ITPS, Swedish Institute For Growth Policy Studies
Studentplan 3, SE-831 40 Östersund, Sweden
Telephone: +46 (0)63 16 66 00
Fax: +46 (0)63 16 66 01
E-mail info@itps.se
www.itps.se
ISSN 1652-0483

For further information, please contact Izumi Tanaka
Telephone +81-3-5562-5043
E-mail izumi.tanaka@itps.se

Table of Content

Summary	5
1 Legislations.....	6
1.1 Fundamental Plan for Establishing a Sound Material-Cycle Society	7
1.2 Law for Promotion of Effective Utilization of Resources	12
2 Material Flow Account	13
3 Spreading Japanese 3R-thinking to the world	15
3.1 G8 3R-Initiative	20
4 Sound Material-Cycle Society to overcome other sustainable development / environmental issues.....	22
5 Concluding remarks	24
References	25

Summary

In the course of economic activities based on mass-production, consumption and disposal, Japan has been discharging an enormous amount of waste. It is now facing significant problems with regard to the shortage of final disposal sites and the adverse environmental effects of inappropriate waste disposal. There is a concern over the depletion of resources and energy for the future due to the change of the global economic status resulting in a surge of resource price such as oil and iron. (METI, 2007a).

Japan generates as much as 470 million tons of waste every year and the number of remaining sustainable years¹ of final disposal sites is reducing; 14.8 years for municipal waste and 7.2 years for industrial waste. (METI 2008). In parallel, supply of raw materials is increasingly at risk as a result of mass-consumption in the developed countries, including Japan. Securing resources such as metals in other ways than importing, and increasing resource efficiency, are of great interest for a resource-poor country like Japan.

The political and economic progress of densely populated developing countries such as China and India are also affecting demand for resources. In the short-run, this increased demand and the possibility of resource nationalism within the developing countries could affect securing of resources. In the long-run the actual depletion of resources or an extreme increase of price in acquiring them could lead to a real shortage. For Japan, which depends highly on the import of resources, this is an ever-growing concern. How does an industrialized country maintain international competitiveness when access to natural resources is uncertain? (partially derived from Adachi and Maeda 2008).

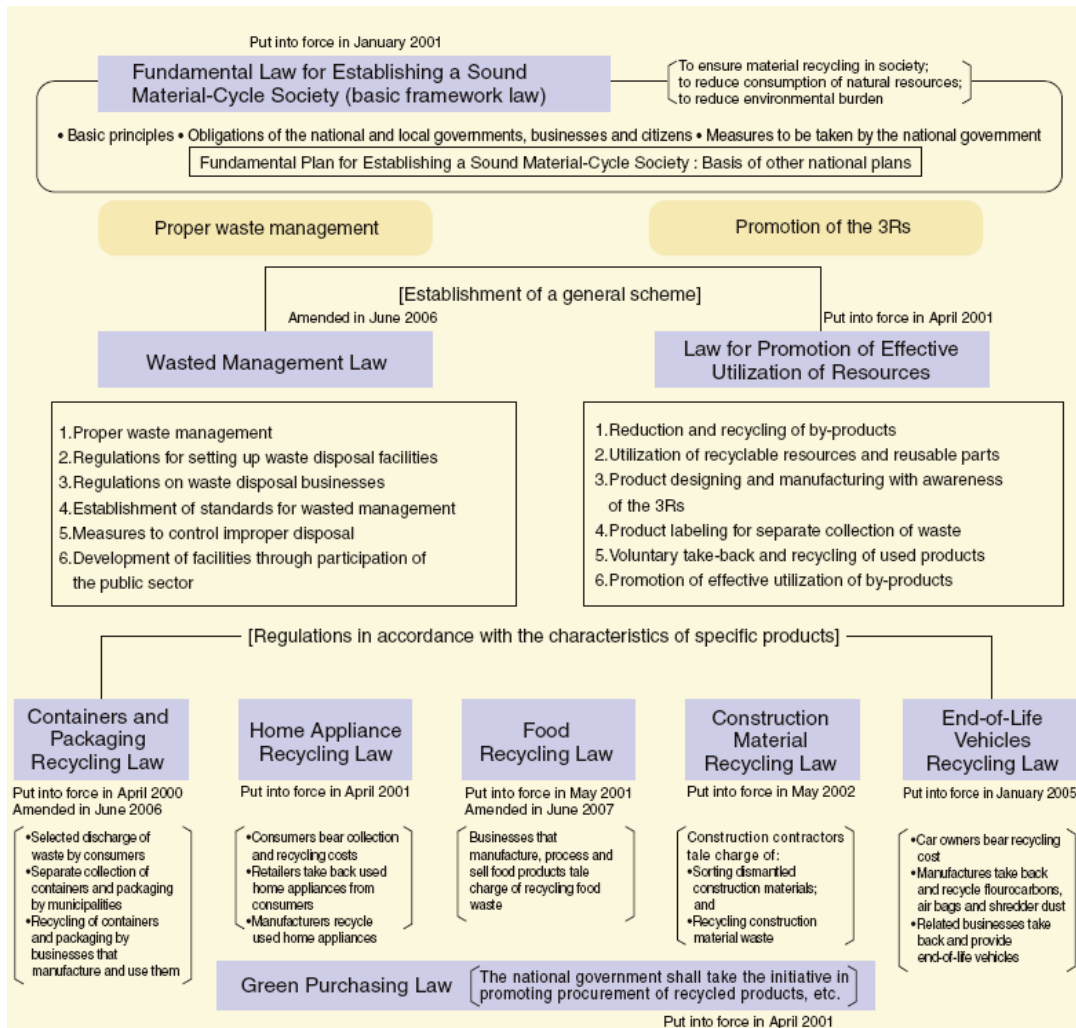
To overcome the dual challenge of increasing waste and constraints of resources, the Japanese government has established the 3R (Reduce, Reuse, Recycle) policy. This promotes reduction of waste generation, reuse of parts/resources, and recycling of used products as raw materials. The ambition of the Japanese government is to advocate the policy both domestically and internationally. By promoting resource efficiency Japan wants to contribute to the solution for similar challenges in both developed and developing countries today.

¹ Number of remaining sustainable years is calculated by “Remaining capacity at the end of the fiscal year” divided by the quotient of “Total final disposal in the fiscal year” divided by “Weight of landfill waste.” The weight of the waste is designated as 0.8163.

1 Legislations

To overcome the challenges with waste and resources that the country faces, Japan has established a series of legislations, including the law-setting framework, the Fundamental Law for Establishing a Sound Material-Cycle Society², (hereafter the Fundamental Law). (Figure 1).

Figure 1 Legislations concerning waste and resource efficiency.



Source: METI 2008.

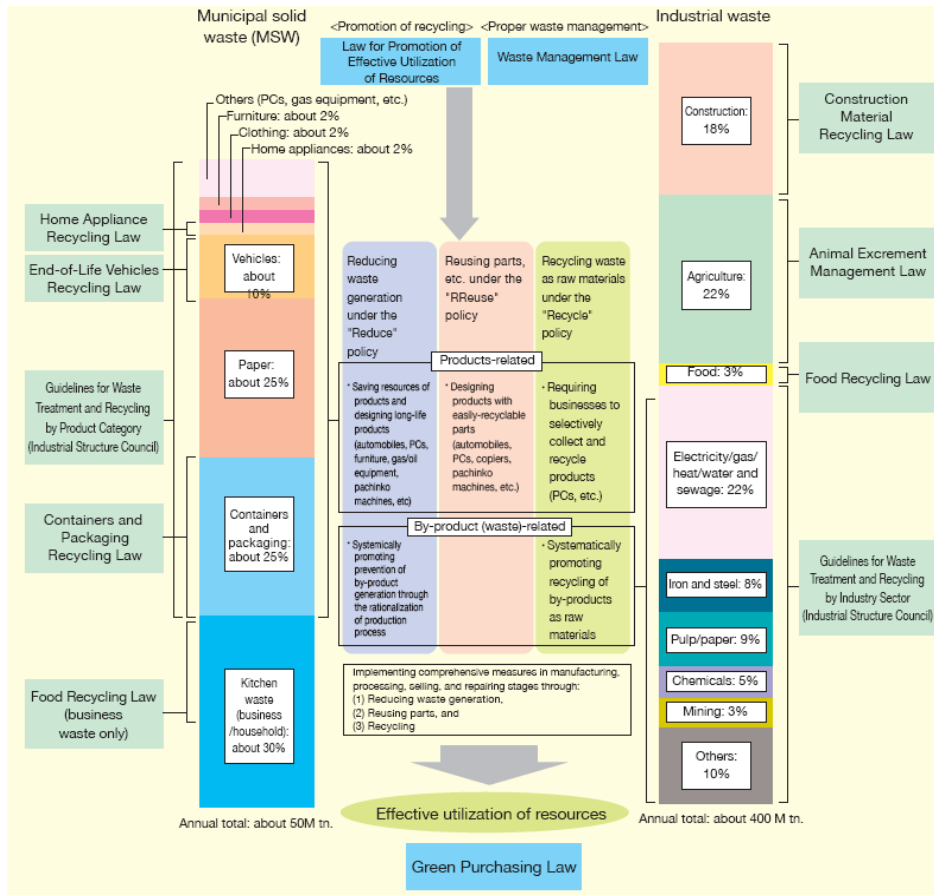
To establish the general scheme, the Waste Management Law and Law for Promotion of Effective Utilization of Resources were implemented. Additional regulations covering end-of-life treatment of separate products/materials such as packaging, home appliances (refrigerator, washer, air conditioner and television set), food, construction material and vehicles were approved. (Figure 2).

² The term "Fundamental" is used interchangeably with the term "Basic," as the term "Sound Material-Cycle Society" is substituted by "3R-Oriented Society." In this document, terms "Fundamental" and "Sound Material-Cycle Society" will be used.

The Ministry of the Environment (MoE), is responsible for the Fundamental Law, and therefore responsible for realizing sound material cycles. The responsibility of managing the municipal waste lies with the MoE, and the efficient use of materials and promoting recycling at private enterprises is the responsibility of the Ministry of Economy, Trade and Industry (METI).

The material flow of bio-material comes under the jurisdiction of Ministry of Agriculture, Forestry and Fisheries (MAFF), whilst the Ministry of Land, Infrastructure and Transportation (MLIT) is responsible for construction material.

Figure 2 Regulation for the management of waste.



Source: METI (2007a).

1.1 Fundamental Plan for Establishing a Sound Material-Cycle Society

Based on the Fundamental Law, the Fundamental Plan for Establishing a Sound Material-Cycle Society (Fundamental Plan), was first set up in 2001 and the revised plan, the Second Fundamental Plan for Establishing a Sound Material-Cycle Society, was enacted in March 2008.

There are three important aspects to the revision of the Fundamental Plan. The first point is the realization of a sustainable society. The revision the Fundamental Plan was based on the document approved by the Cabinet in June 2007 titled Becoming a Leading Environmental Nation Strategy in the 21st Century – Japan's strategy for a Sustainable

Society, (hereafter the Environmental Nation Strategy), as well as the three evaluations conducted of the 1st Fundamental Plan. (Government of Japan, 2007). The Environmental Nation Strategy proposes building a sustainable society through comprehensive measures integrating the following three aspects of the society;

- A Low Carbon Society,
- A Sound Material-Cycle Society, and
- A Society in Harmony with Nature.

The strategy stresses the utilization of wisdom and tradition of living in harmony with nature, together with the world-renowned environmental and energy technologies. It also stresses Japan's experience and knowledge of overcoming serious pollution, and its abundant human resources – full of earnestness and abilities to create a driving force – that can bring forth environment-oriented economic growth and invigorate local communities (see figure 3). It calls for cooperation between different actors in various sectors to create a "Japanese model" for a graceful "Environmental Nation" that also can contribute to the development and prosperity of the world, dispatching the idea throughout Asia, and to the world. (MoE 2008a).

With the Environmental Nation Strategy placing emphasis on the interrelation between the three different aspects of what the government of Japan envisions as a sustainable society, the synergy between the different aspects has increasing importance. Therefore, the possible impact or synergy effect the resources policy may have on the other two components of a sustainable society, has increased emphasis in the newly revised Fundamental Plan. The interrelation of resource issues with other environmental issues are discussed further in chapter 4.

Figure 3 Japan's strategy for a Sustainable Society.

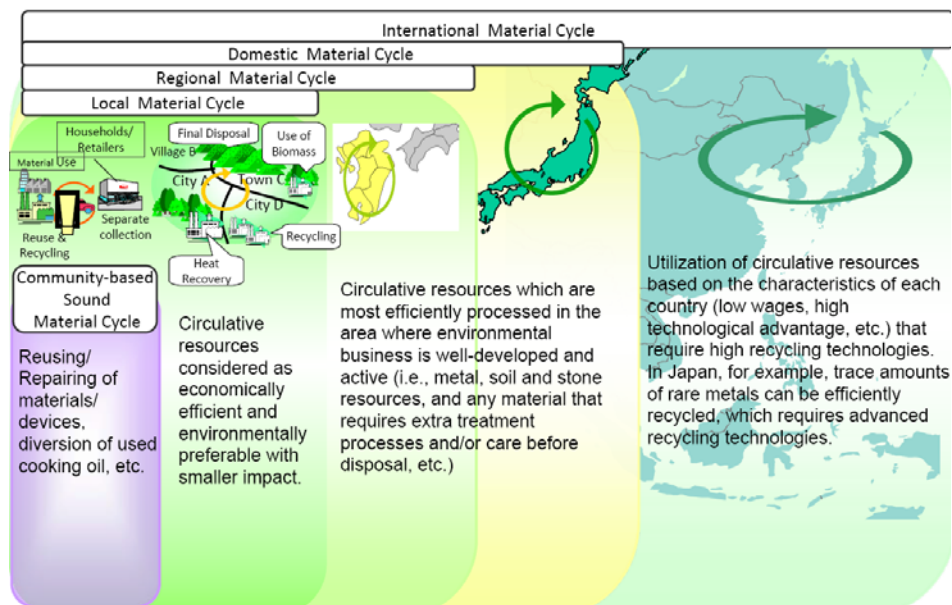


Source: Takeuchi 2008a.

The second important point of the revision is the realization of regionally-characteristic Spheres of Sound Material Cycle (SSMC). This concept calls for designating an adequate locality (or "sphere") for processing of waste depending on its characteristics as a resource and the environmental and economical burden it may cause. For example, much of the biomass waste is most beneficial environmentally and economically to be utilized at more local level, whereas materials such as rare materials requiring advanced recycling technologies may need to consider circulation of resource over the domestic boundary.

(Figure 4) (MoE 2008a). Issues concerning the inter-boundary shipment of the materials will be discussed further in chapter 3.

Figure 4 Spheres of Sound Material Cycle.



Source: Takeuchi 2008a.

In the Fundamental Plan established in March 2004, based on the national Material Flow Account (MFA), three indices of different phases of the material flow were established. The indices are defined as “entry”, “recycled” and “exit.” Numerical targets were established based on the past trends in technology innovation and demand structure of goods and services, (METI, 2007a) (table 1). The targets and deadlines were updated in the 2nd Fundamental Plan for Establishing a Sound Material-Cycle Society established in March 2008. (table 2). The above-mentioned indicators were also adopted by the leaders at the G8 Summit in St. Petersburg in 2006, and it was suggested all participating countries to have goals based on the indicators. (Yoshida, 2007). The actual trends of the indicators are plotted in figure 5.

Table 1 Three indices and their targets.

Index	Definition	Target in 2015 (numbers in 1999, 2004)
Entry	Material productivity representing effectively use of material (how much affluence is produced with less resource)	420,000 yen / ton (210,000 yen/ton, 336,000 yen/ton)
Recycled	Usage rate of recycled goods representing how much resources input are in cyclically used (reuse and reuse after treatment)	14-15 % (8 %, 12.8 %)
	(=Usage rate of recycled goods / (Usage rate of recycled goods + amount of natural resources used)	
Exit	Final Disposal Amount of final disposal (land-filled waste)	23 million ton (110 million ton, 35 million tons)

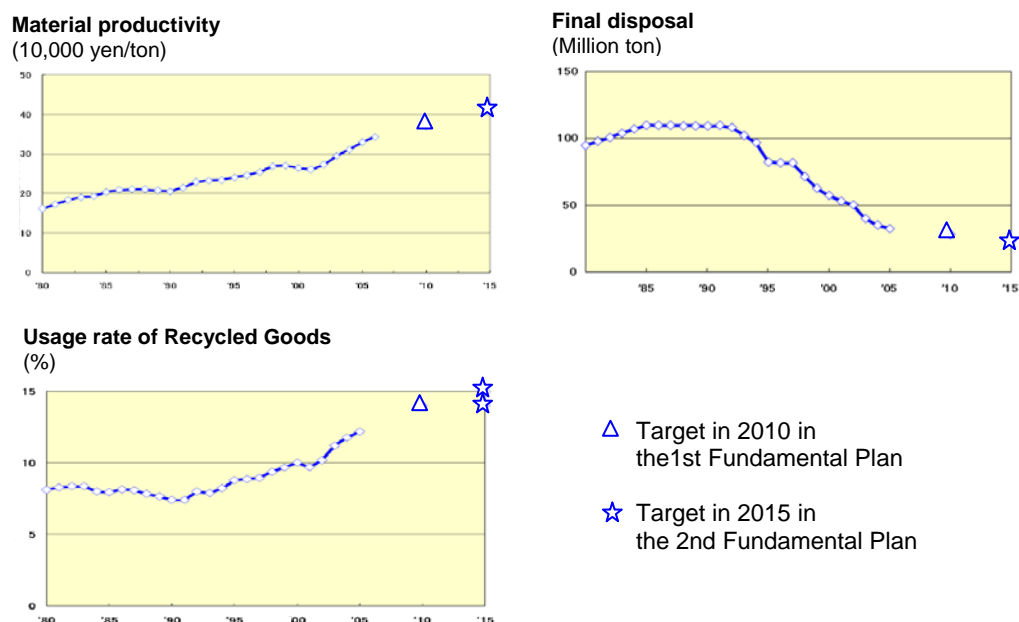
Source: Created by the author based on METI 2007a and Takeuchi 2008a.

Table 2 Comparison of target numbers between 1st and 2nd Fundamental Plans.

Index	1 st Fundamental Plan		2 nd Fundamental Plan	
	Target in 2010	Compared to 2000	Target in 2015	Compared to 2000
Entry	370,000 yen/ton	Appr. 40 % increase	420,000 yen / ton	Appr. 60 % increase
Recycled	14%	Appr. 40 % increase	14–15 %	Appr. 40–50 % increase
Exit	28 million ton	Appr. 50 % reduction	23 million ton	Appr. 60 % reduction

Source: Created by author based on MoE 2008a

Figure 5 Progress and target of the three indicators.



Source: Created by author based on 2008.

In addition to setting strengthened targets for the three indications, *supplementary indicators for target setting* and *indicators to be monitored* were introduced as follows:

Supplementary indicators for target setting

1. Resource productivity not including resource input of soil and stone
2. Collaboration with the action for low carbon society
 - the amount of reduction by the measures of waste sector to reduce GHGs emission

- GHGs emission associated with waste sector and fossil fuels to be substituted by waste power generation

Indicators to monitor progress

1. Resource productivity related to fossil fuels
2. Input rate of biomass resources
3. Hidden Flow and Total Material Requirement (TMR)
4. Indicators considering international resource circulation
5. Resource productivity of each industrial sector

The above-mentioned indicators based on Material Flow are complemented by the second set of indicators measuring the activity level. They are as follows:

Indicators with target setting

- 1 Reducing the Quantity of Waste (municipal solid waste and industrial waste)
- 2 Changes in Thoughts and Actions to Establishing a Sound Material-Cycle Society
- 3 Promoting Sound Material-Cycle Society Businesses (green purchasing, environmental business management, sound material-cycle society business market)
- 4 Steady implementation of individual recycling laws

Indicators to monitor progress

- 1 Market size of rental and lease service, the delivery rate of refillable products
- 2 Refuse rate of plastic bag, the sales of disposable goods
- 3 Size of second-hand product market, the use rate of reusable bin
- 4 Number of stadium which introduced “reuse cup”.
- 5 Number of local Fundamental Plan for Establishing Sound Material Cycle Society
- 6 Implementation rate of local governments charging waste management
- 7 Number of facilities for material recovery
- 8 Recycle rate of municipal solid waste, the implementation rate of local governments conducting sorted collection of containers and packaging etc.
- 9 Number of environmental education and mutual exchange events organized by local governments

Source: Takeuchi 2008.

The enhancement of the Material Flow indicators is based on the findings of the three evaluations conducted on the Fundamental Plan. These confirmed the positive trend in fulfilling the goal set for 2010. One may wonder if the goals were too unchallenging to start with, however the experts involved in the establishment of the goals feel that the goals are appropriately ambitious and the positive development is due to series of laws enacted in recent years.

Indicators monitoring the activity level are an attempt to spread the effort further across all stakeholders in the society, not only at the national government level, but at local government, private sector and general public level. Although participation of various

magnitudes by stakeholders mentioned above is indicated in the text of the Fundamental Plan, their actual commitment is more clearly advocated by establishing indicators in the revised Fundamental Plan that set out to measure their progress.

1.2 Law for Promotion of Effective Utilization of Resources

Under the framework of the Fundamental Law, the Fundamental Plan for Establishing a Sound Material-Cycle Society, 3R policies are promoted with the Law for Promotion of Effective Utilization of Resources. (Figure 1).

The Law for Promotion of Effective Utilization of Resources was established in April 2001 to provide for measures to be taken by businesses, such as;

- 3R-related measures in the production stage,
- 3R consideration in the product designing stage,
- labelling for separated collection, and
- development of a system for voluntary collection and recycling by manufacturers.

Source: (METI 2008).

Although the progress as expressed by the three fore-mentioned indices was positive, revision was suggested to further promote efficient use of resources for the growth of the domestic industries, as well as improving the acquisition of resources such as rare metals, which are becoming more at risk with the sprouting growth of demand from growing giant economies.

A working group, consisting of experts from academia and industry and public officials from the Ministry of Economy, Trade and Industry was formed in January 2007 to discuss possible revision of the law by March 2008.

The main issues discussed for the revision of the law were:

1. Promotion of environmentally-conscious design (i.e. Design for Environment (DfE) etc.) with a life cycle perspective
2. Information dissemination of environmental product information to the consumers
3. Consideration of export of recovered material for the purpose of recycling
4. Promotion of voluntary activities of collection and recycling of used goods
5. Promotion of reuse / recycle of by-product from raw material industry

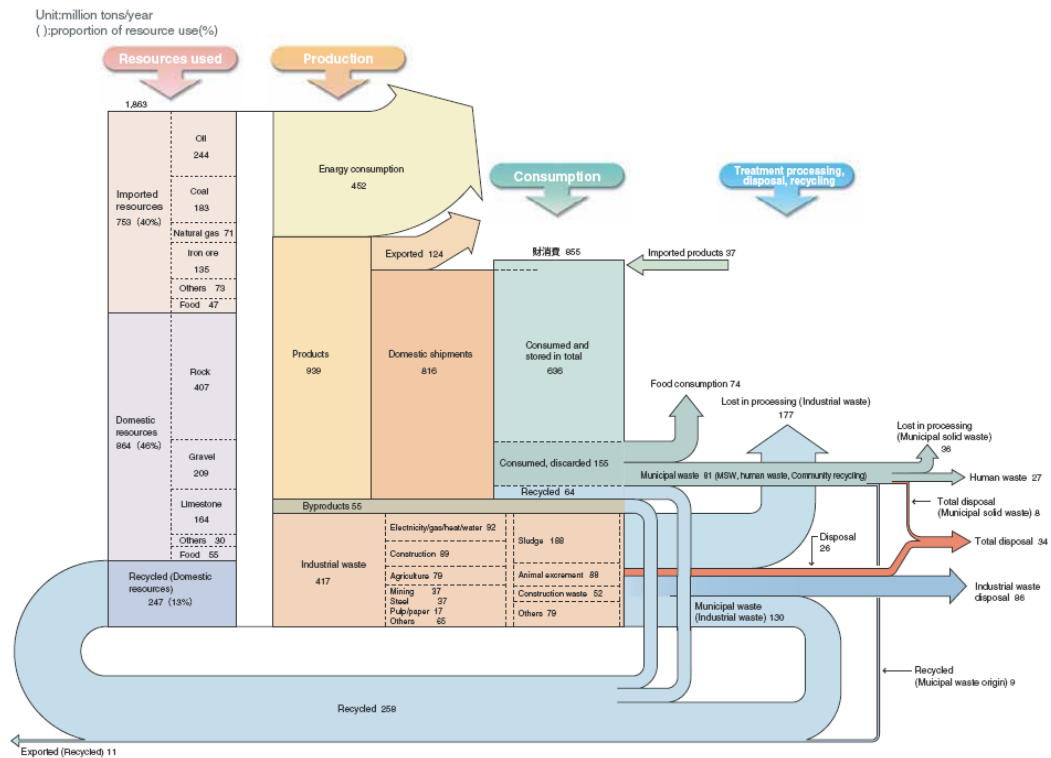
Source: METI, 2007b.

The objective of the working group was to continue with the underlining basic strategy, to strengthen the implementation and at the same time to extend the scope of the system by expansion of industrial sectors and products to be covered by the law. For that reason, the concept of life cycle perspective and supply chain for collection and recycling of the end-of-life products are newly introduced, as well as continuation of similar perception from the Law for Promotion of Effective Utilization of Resources established in April 2001. (Yokoyama).

2 Material Flow Account

Material flow accounts play a vital role in the strategic work of Japan on establishing a Sound Material-Cycle Society (SMS). (see figure 6). For example, the three material indicators, namely “entry,” “recycle” and “exit,” introduced in the Fundamental Plan are calculated by the data and information provided by the material flow account.

Figure 6 National material flow of Japan (2004). Million tons per year.



Source: METI 2008.

Additionally, the material flow account was analyzed in detail, for example by stage of the flow (i.e. disposal), sectors and materials to consider separate measures, for example, recycling measures on certain product groups or utilization of organic waste.

The following six issues were raised in the result of review of the material flow account of fiscal year 2004.

1. High amount of “total resources used”
2. High amount of “natural resources used” (both import and domestic) (also known as “Direct Material Input= DMI, consideration for the hidden flow is not reflected)
3. Imbalance between the total resource / product input and the output. Only 1/6 of the imported resource / product is exported and internationally viewed, the material cycle is not in balance
4. Low amount of “recycled” The number includes water included in the material and the actual amount of recycled content would be lower

5. High total disposal
6. High energy consumption

Source: MoE 2007a.

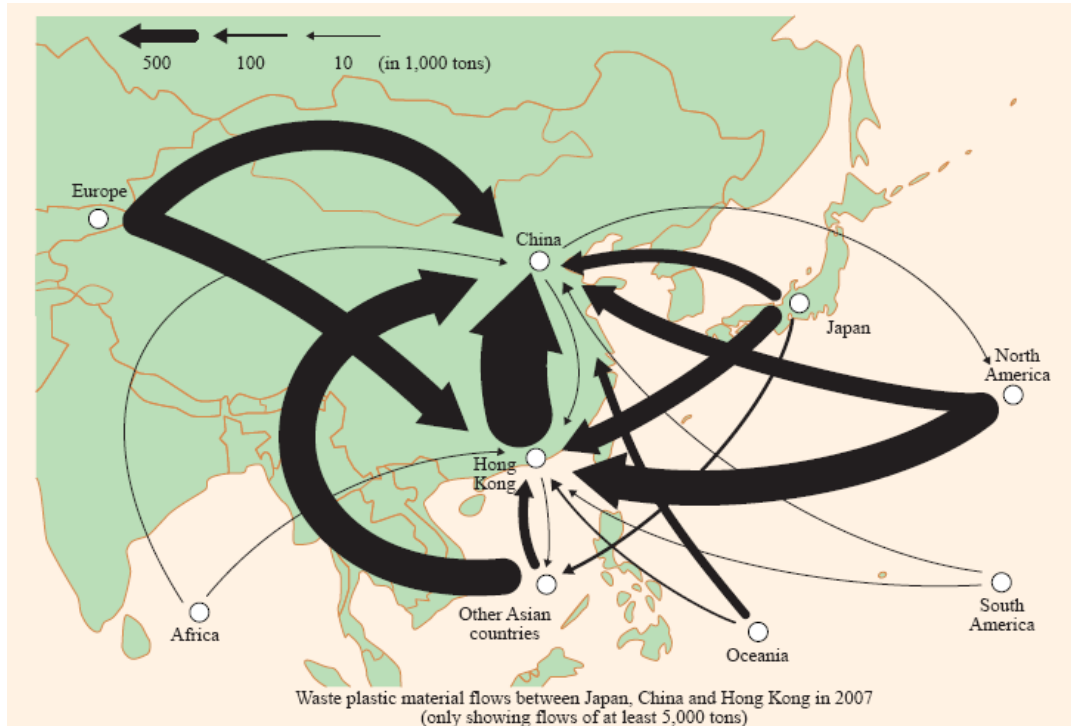
A working group on material flow, organized by Institute for Global Environmental Strategies (IGES) on commission from the Ministry of the Environment conducts work on the establishment and analyzing the material flow analysis. (Matsumoto).

Japan values the international collaboration on the work of Material Flow Account, indicated by presence and chairmanship at the Organization for Economic Co-operation and Development (OECD). The Working Group on Environmental Information and Outlooks supports and encourages countries to prepare national material flow data under a common accounting framework as a basis for calculating a harmonised core set of practical material flow indicators.

3 Spreading Japanese 3R-thinking to the world

The current ambition of Japan to establish a Sound Material-Cycle Society (SMS) at international level, due to the scope of movement of waste and recyclable materials, has placed geographical emphasis on East Asia, namely South Korea and China as well as the countries of Southeast Asia. (Figure 7).

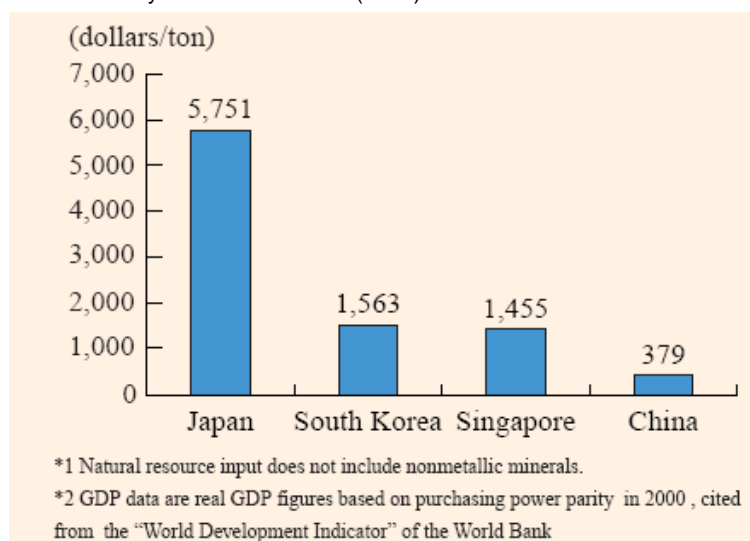
Figure 7 International resource circulation.



Source: MoE 2008b.

Already, due to fast economic development among Asian countries, the transboundary movement of waste has rapidly increased, raising concerns over its potential negative environmental impact. And with Japan having much higher resource productivity compared to other Asian countries, this is another reason for its engagement in competence building in other parts of Asia. (Figure 7).

Figure 8 Resource Productivity in Asian Countries (2004).



Source: MoE 2008b.

The following three processes are advocated by Japan:

1. Establishment of domestic SMS at each individual country

The first step is improving each country's ability to appropriately dispose of waste by means including recycling and reuse within its borders.

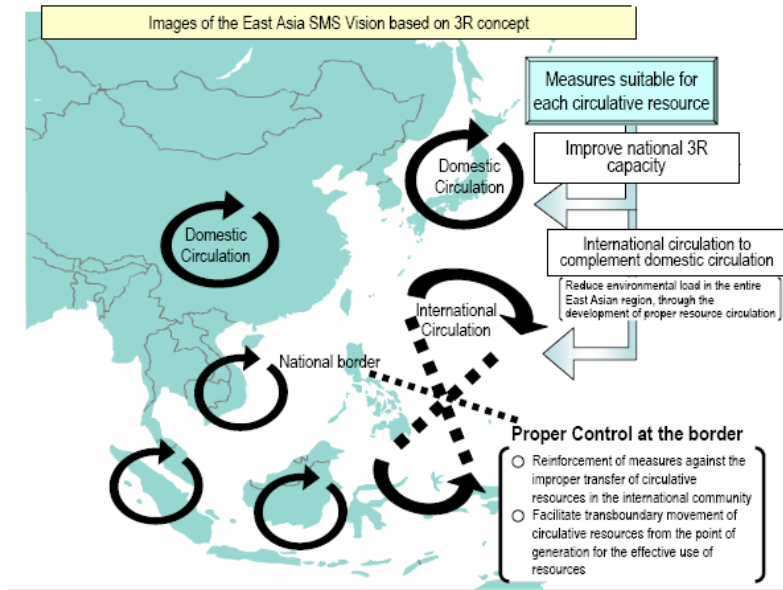
2. Enhancing and reinforcing activities to prevent illegal import and export of waste

After each country has established an SMS to the best of its ability, transboundary movement of waste may be called for to be able to process the waste which may not be able to be utilized (i.e. reused or recycled) properly and efficiently to another country. To realize such scheme, enhancement and reinforcement of measures to prevent illegal exports is needed.

3. Facilitating import/export of recovered resources

After the two fore-mentioned processes have been implemented, only then should import and export of waste and recovered resources should be promoted. This should lead to suitable prevention of environmental pollution as well as contribute to environmental preservation across East Asia as a whole. (MoE, 2006). (Figure 9).

Figure 9 Image of the East Asia SMS vision based on 3R concept.

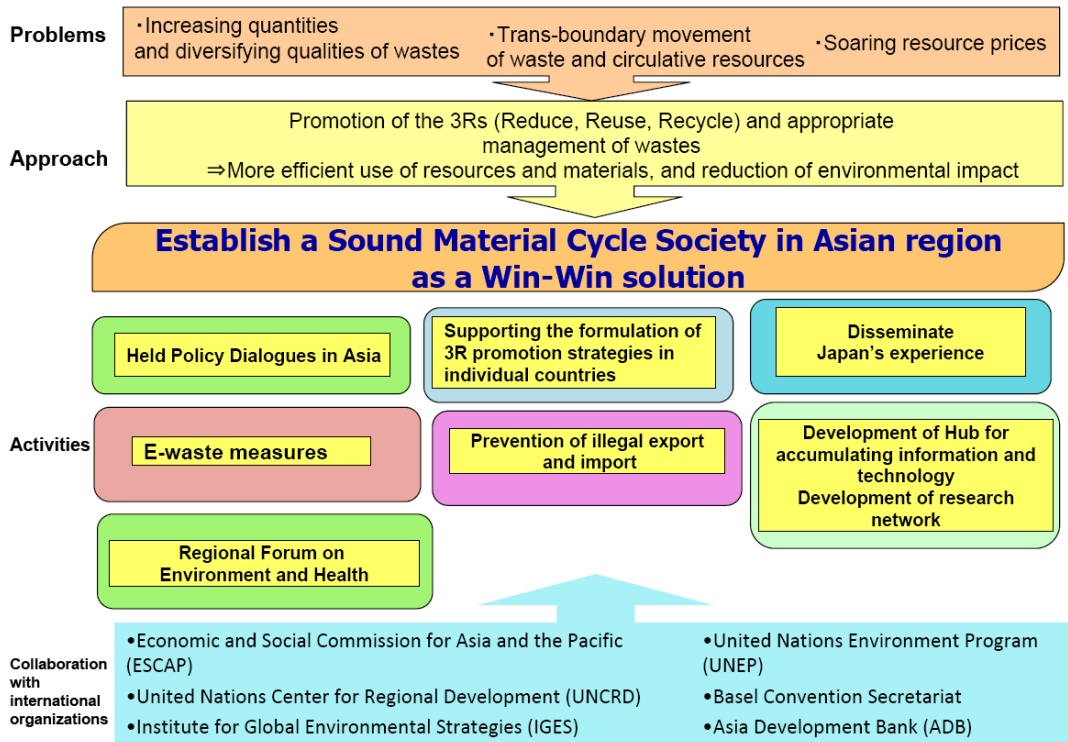


Source: MoE, 2006.

Promotion of regional efforts for the creation of SMS is conducted through meetings such as the Environment Congress for Asia and the Pacific (ECO Asia), the Tripartite Environment Ministers Meeting among China, Japan and Korea (TEMM), Asian Network for Prevention of Illegal Transboundary Movement of Hazardous Wastes and Association of Southeast Asian Nations (ASEAN). Other international functions, such as G8, United Nations Environment Programme (UNEP) and the Organization for Economic Co-operation and Development (OECD) are utilized to further strengthen links with other countries. (MoE, 2006).

Promotion of 3R in Asia is presented in the 2nd Fundamental Plan as follows:

Figure 10 Promotion of the 3Rs in Asia.



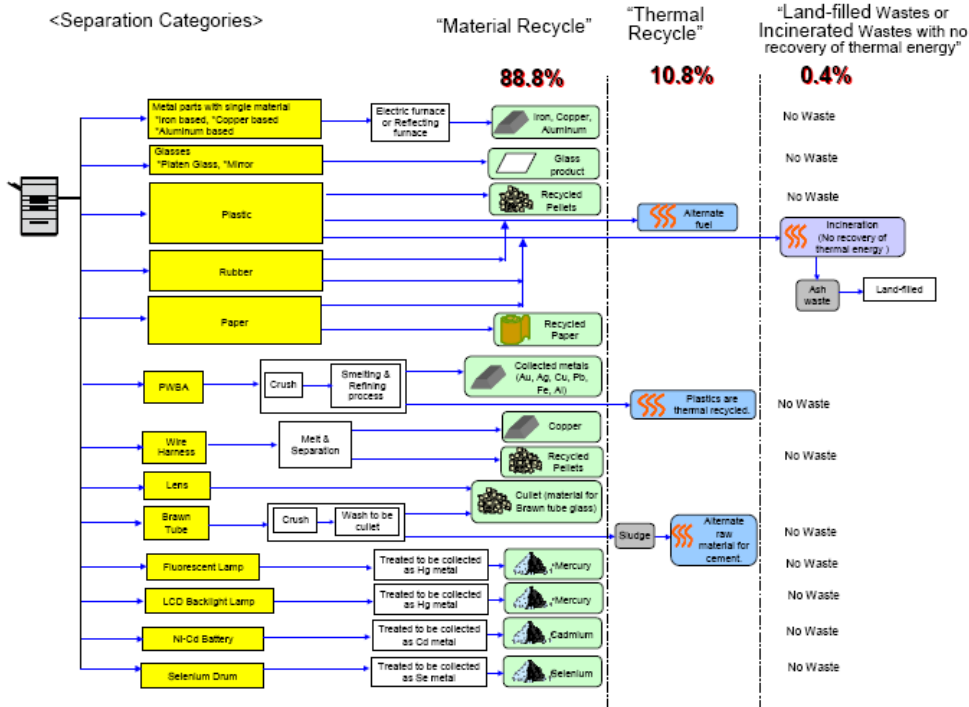
Source: Takeuchi 2008a.

There have been some concerns voiced about the strategy the Japanese government is exploring concerning material circulation in Asia and it may conflict with the Basel Convention. However, government officials stress that all Japanese strategies are based on conformity to the Basel Convention. The scheme the Japanese government is suggesting does however differ from the EU's scheme for international resource flow, which discourages international movement of waste. Additionally, there have been comments from NGOs that signing of Economic Partnership Agreement (EPA), which Japan has already signed with countries and entities such as Singapore, Indonesia, and Association of South-East Asian Nations, may further encourage the transboundary movement of waste. However, the Basel Convention is still abiding even after EPA is enacted. (Takeuchi 2008b).

In the recently years, there has been a few examples of cross-border recycling by Japanese companies.

- **Fuji Xerox** – A manufacturer of office equipment/supplies such as copying machines has established a centralized recycling center in Thailand, where equipment from nine countries/regions in Asia-Pacific is collected and accumulated to be reallocated to recycling processors (12 partners in Thailand/Asia and four partners in Japan) with appropriate skill and technology for achieving high recycling ratio. (Yoshida 2007, Watanabe 2006). (Figure 11).

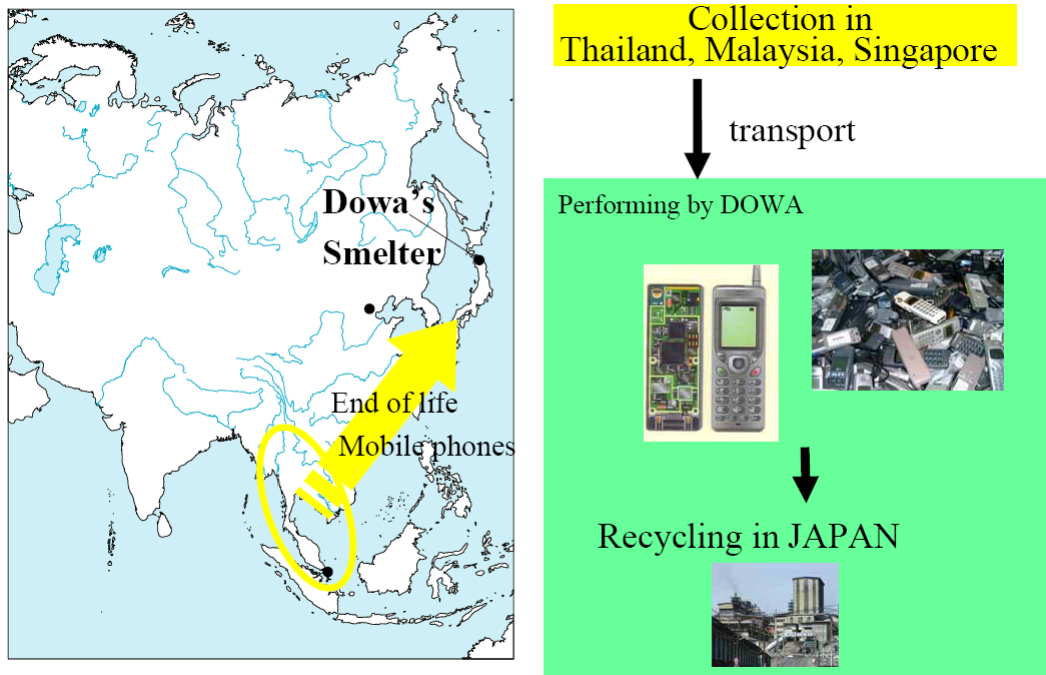
Figure 11 Recycling Flow of Used Xerox Office Equipment.



- Dowa Eco-System** – A subsidiary of a mining company, Dowa Metals & Mining, conducting business in environmental management and recycling. Dowa Eco-System is engaged in recovery of metal from e-waste and since 2006, a pilot project to establish scheme for collection and movement of e-waste from Southeast Asia to Japan is being operated. The objective of the pilot project is to:

 - 1 Establish collecting scheme of end of life mobile phones generated in Malaysia, Singapore and Thailand through a collaboration with relevant authorities.
 - 2 Establish transboundary movement scheme of the mobile phones from those countries to Japan.
 - 3 Investigate the possible application of the schemes to other e-wastes (Naka, 2006). (Figure 12).

Figure 12 International recycling network of mobile phone in the Asian region.



Source: Naka 2006.

Both are cases where recovered material is collected and partly processed in or near place of discard and then taken to Japan for advanced recycling.

3.1 G8 3R-Initiative

In particular, G8 has been one arena in which Japan has actively promoted the 3R concept. At the G8 Sea Island Summit in 2004, 3R matters were agreed to be one of the G8 initiatives to be discussed at various venues. 3R, along with global warming and biodiversity, was one of the main topics to be discussed among the G8 leaders during the G8 Hokkaido Toyako Summit in July 2008. (Table 3)

Table 3 Promotion of 3R Initiative.

2004	G8 Sea Island Summit (USA) "3R" Action Plan and the Progress of Implementation
2005	Ministerial Conference on the 3R Initiative (Tokyo) G8 Gleneagles Summit (UK) 2nd Int'l Expert Meeting on a 10-year Framework of Programmes for Sustainable Consumption and Production (Costa Rica)
2006	Senior Officials Meeting on the 3R Initiative (Tokyo) G8 Saint Petersburg Summit (Russia)
2007	G8 Summit (Germany) 3 rd Int'l Expert Meeting on a 10-year Framework of Programmes for Sustainable Consumption and Production (Sweden)
2008	G8 Environmental Ministers Meeting (Kobe) G8 Hokkaido Toyako Summit

Source: Yoshida 2007.

At the G8 Environmental Ministers Meeting, the Kobe 3R Action Plan was adopted and endorsed by the leaders of G8 during the Summit. It calls for G8 countries to take action towards the following three goals:

- prioritize 3Rs policies and improve resource productivity,
- establish an international sound material-cycle society, and
- collaborate for 3Rs capacity development in developing countries.

The progress of activities, policies and measures implemented based on the action plan is to be reported to the G8 Environment Ministers Meeting in 2011. (G8 Environmental Ministers 2008).

With the United States not having agreed to the Basel Convention, the inclusion of any reference to the Convention has been a difficult task. However, in the G8 Hokkaido Toyako Summit Leaders Declaration, a clause stating support for international circulation of reusable and recyclable materials and resources in an environmentally sound manner consistent with the Basel Convention was included (G8 2008). As the reference to the Basel Convention is also seen throughout the text of the Kobe 3R Action Plan, it illustrates the position of the Japanese government to respect the Basel Convention in discussing the 3R Initiative.

4 Sound Material-Cycle Society to overcome other sustainable development / environmental issues

Japan faces other environmental / sustainable development challenges, just as other countries around the globe. In the Fundamental Plan, it is articulated that impact to other environment issues need to be considered in the process of realization of the Sound Material-Cycle Society. However, details in comprehensive perspective, for example including energy or toxicity issues in the picture, still need to be explored.

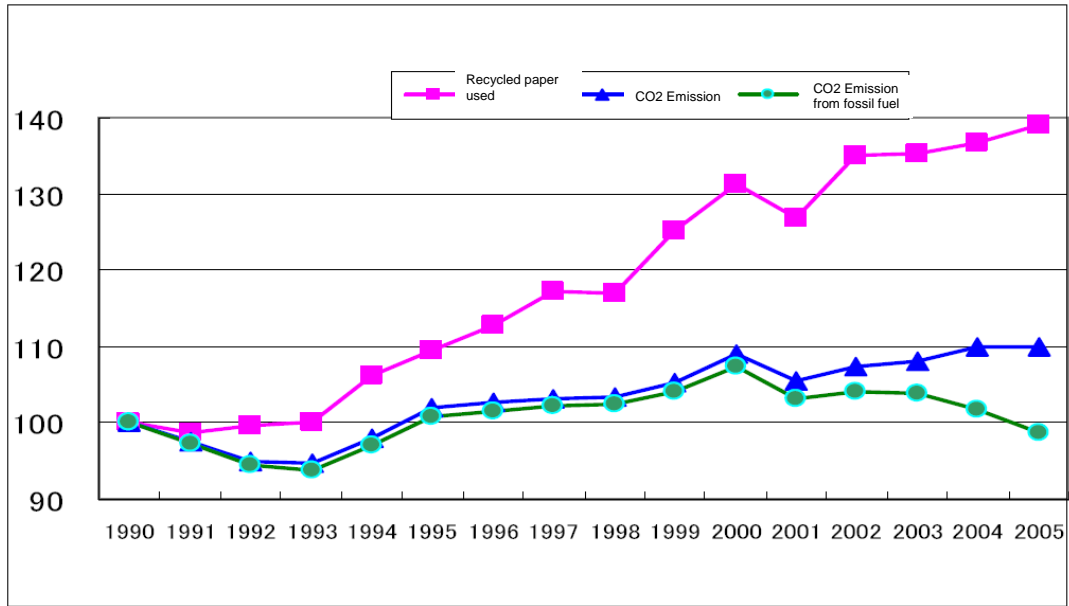
Separate laws provided for the control of toxic chemical substances incorporated in business operation. For example, the Law for Promoting Management of Release of Chemical Substances was established in correspondence to the PRTR System implemented by the OECD and covers topics such as release into the environment and substances contained in waste and transferred out of private premises. (Matsumoto).

The relation between waste management policy and climate change policy is clearly articulated in the Kyoto Target Achievement Plan (KTAP), established in July 2006. However, the notion in the KTAP is only limited to one particular issue of waste management; waste incineration. Within KTAP, it is mentioned as one of the “measures to reduce green house gas emission not from primary energy consumption,” reduce/reuse/recycle should be promoted to decrease amount of waste going into incineration. As Japan incinerates most of the municipal waste, KTAP indicates that measures should be taken to minimize green house gas during the incineration process. (MoE, 2007b) Additionally, in “Strategy 3 Creation of Sustainable Material-Cycles through the 3Rs” of “Becoming a Leading Environmental Nation Strategy in the 21st Century -Japan's strategy for a Sustainable Society,” it is stated that Japan will introduce its 3R systems, technologies, and experiences internationally, undertaking efforts to make them increasingly sophisticated, while contributing to the mitigation of climate change and promoting the 3R Initiative within the G8. Here it is stated that contribution to reduction of green house gas emission can be realized by practicing waste management to recover energy from wastes and to utilize waste-based biomass. (Government of Japan, 2007).

Currently there is no systematic and quantitative method to show the clear relation between environmental effects, for example reduction of GHG emissions, and the 3R policies. However, the need for such scheme is clearly stated, for example in the discussions at the Working Group for the Fundamental Policy, Recycling Committee, Industrial Structure Council. Specifically it is articulated, such a method as life cycle assessment should be utilized to consider effects of measures taken by the industry to meet the needs of 3R policies. For example, there are suspicions that the policies on 3R may have a trade-off relation with reduction of green house gas emission. In the pulp and paper industry, with the increased utilization of recycled content, the black liquor recovered from the process using virgin wood chips, which are utilized as biomass energy source, decreases. Therefore the overall energy required increases.

The industry is attempting to cover the increased need of energy by utilizing renewable energy, however, the total CO₂ emission is still on the increase. (Figure 13).

Figure 13 Use of recycle paper and CO2 emission.



Source: METI 2007b.

The point to note from the example of the pulp and paper industry is the need for a scheme to consider for such a phenomenon, for example, by identifying the system boundaries in calculating CO₂ emissions. (METI, 2007b).

5 Concluding remarks

For Japan, policies to promote efficient use of resources, along with other issues such as climate change, are considered to be very important. At the national level, a series of policies have been introduced to realize a Sound Material-Cycle Society, a society which practices 3R, reducing the use of materials and reusing and recycling them when possible. The indicators created based on the material flow analysis shows that Japan, indeed, is heading in the right direction. The indicators confirm an increase in resource efficiency by being able to produce more value with less resources, an increased rate of recycling and a reduced amount of final disposal. However, there still are challenges to overcome, including fine-tuning of Material Flow Analysis to obtain more accurate data.

The newly established Fundamental Plan for Establishing a Sound Material-Cycle Society calls for even stricter targets for the material flow indicators, as well as indicators measuring the efforts by the different stakeholders involved. The Fundamental Plan also stresses the correlation with other sustainability issues, such as “A Low Carbon Society (climate change)” and “Harmony with Nature (biodiversity).” A similar concern was voiced during the evaluation of the Law for Promotion of Effective Utilization of Resources, to observe the relationship between resource/waste policies and other environmental policies. The actual method to measure the interrelation of the issues is still lacking and it is a challenge for Japan to be able to establish such methodology.

Japan also emphasizes the importance of its role in the international scheme regarding resource efficiency. Most notably, the circulation of resources in the Asian regions is of great importance. Activities concerning competence development in the developing countries to develop their own 3R strategy and bilateral or multi-lateral discussions for proper resource circulation and improvement of resource productivity in the Asian Region, as well as the leadership in G8 on the topic, will continue to be important aspect of Japanese contribution to the international arena. Although there are cases where the Japanese strategy has been accepted, for example, establishment of 3R strategy in number of countries in Asia and highlighting 3R as an initiative in G8, continued discussion and mending differences with other related international agreements remains to be a challenge for Japan.

References

Documents:

- Government of Japan, 2007 *Becoming a Leading Environmental Nation Strategy in the 21st Century – Japan's strategy for a Sustainable Society (tentative translation)*
<http://www.env.go.jp/en/focus/attach/070606-b.pdf>
- G8, 2008 *G8 Hokkaido Toyako Summit Leaders Declaration*
http://www.g8summit.go.jp/eng/doc/doc080714_en.html
- G8 Environmental Ministers, 2008, *Kobe 3R Action Plan*,
<http://www.env.go.jp/en/focus/attach/080610-a5.pdf>
- METI, 2008, *Towards 3R-Oriented, Sustainable Society: Legislation and Trends 2008*
http://www.meti.go.jp/policy/recycle/main/data/pamphlet/pdf/handbook2008_eng.pdf
- METI, 2007a, *Towards 3R-Oriented, Sustainable Society: Legislation and Trends 2007*
www.meti.go.jp/policy/recycle/main/data/pamphlet/pdf/handbook2007_eng.pdf
- METI, 2007b, *Material from the Fourth Meeting of Working Group for the Fundamental Policy*, Recycling Committee, Industrial Structure Council (METI) *only available in Japanese*
- MoE, 2008a, *Dai 2ji Junkan gata shakai keisei kihon keikaku no gaiyouni tsuite* (The Summary of 2nd 1.1 Fundamental Plan for Establishing a Sound Material-Cycle Society) *only available in Japanese*
http://www.env.go.jp/recycle/circul/keikaku/gaiyo_2.pdf
- MoE, 2008b, *Annual Report on the Environment and the Sound Material-Cycle Society in Japan 2008*, <http://www.env.go.jp/en/wpaper/2008/>
- MoE, 2007a, *Kankyo/ Junkan gata shakai Hakusho* (Whitepaper on the Environment and the Sound Material-Cycle Society) *only available in Japanese*
<http://www.env.go.jp/policy/hakusyo/h19/html/hj07030402.html>
- MoE, 2007b, *Junkan gata shakai keisei kihon keikaku – dai sankai hyouka*, (The third evaluation of the Fundamental Plan for Establishing a Sound Material-Cycle Society) *only available in Japanese*
- MoE, 2006, *Sweeping Policy Reform Towards a "Sound Material-Cycle Society" – Starting from Japan and spreading over the entire globe*
www.env.go.jp/en/wpaper/smc2006/fulltext.pdf
- Naka, Masayuki 2006 *International Recycling Network of Mobile Phone in Asia Region* (Dowa Eco-System Co. Ltd.) presented at the Asia 3R Conference, October 31, 2006 Tokyo, Japan, http://www.env.go.jp/recycle/3r/en/asia/02_03-4/05.pdf

Adachi, Tsuyoshi and Maeda, Masafumi 2008, *Shigen kokatsuno shinsou* (The Truth of Resource Depletion) pp. 70–71 Vol. 13 No. 7 “*Gakujutsu no doukou*” (The Trend in Academia) *only available in Japanese*

Takeuchi, Kazuhiko 2008a *Promotion of Resource Resource-Circulating Society* presented at the OECD-UNEP Conference on Resource Efficiency, April 24, 2008, Paris, France

Watanabe, Tomio 2006, *Fuji Xerox International Resource Recycling System in Asia-pacific region*” presented at the Asia 3R Conference, October 31, 2006 Tokyo, Japan, http://www.env.go.jp/recycle/3r/en/asia/02_03-1/11.pdf

Yoshida, Hideto 2007, *Japan’s Measures for Waste Management and Recovery*, presented at the International Symposium on Waste Management and Recycling October 23, 2007, Tokyo, Japan

Personal communication:

Matsumoto 2007, Ministry of the Environment

Takeuchi 2008b, Chair, Central Environment Council, Planning Committee on Sound Material-Cycle Society, Government of Japan

Yokoyama 2007, Japan Environmental Managers Association for Industry (JEMAI), member of the Working Group for the Fundamental Policy, Recycling Committee, Industrial Structure Council (METI)

The Swedish Institute for Growth Policy Studies (ITPS) is a Government Agency responsible for providing policy intelligence to strengthen growth policy in Sweden. ITPS primarily provides the Government Offices, Members of the Swedish Parliament, other state authorities and agencies with briefings based on statistical material, policy papers and key analyses. Business policy and regional development policy are areas given high priority.

Changes in policy should be based on:

- Statistic data and analyses of the structure and dynamics of industry – to obtain an up-to-date view of future challenges and opportunities.
- Evaluation of results and effects of policy measures and programmes – to provide benchmarks and learn from measures implemented earlier.
- Policy intelligence in order to look outwards and ahead – what issues are likely to come on the growth policy agenda in the future?

These represent the principal missions of ITPS.