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Proposals to Strengthen Japan's Domestic Measures and Regional Cooperation on Stable and Environmentally Sound Plastic Scrap Recycling: Response to China's Ban on Imports of Plastic Scrap

Key messages

- As a result of China's restrictions on plastic scrap imports, the recycling routes for plastic scrap generated in Japan have shifted from China to Southeast and East Asian countries. In light of the high demand for plastic raw materials in China, recycling routes have developed whereby plastic scrap is exported from Japan to be recycled and processed in Southeast and East Asian countries, after which it is transported to China for use in plastic production. However, risks for environmental pollution are escalating rapidly in these countries due to the rapid increase of imported plastic scrap. In response, governments have implemented countermeasures, such as banning and restricting imports.
- As a result, this policy brief shows that Japan's high-quality plastic scrap will likely be exported and recycled in international recycling routes, while low-grade plastic scrap will be processed domestically as waste (including thermal recycling) in Japan. Stricter standards and import restrictions in Southeast and East Asian countries are likely to continue and expand due to concerns about environmental sustainability. At the same time, the lack of a harmonized approach in the region can distort markets for recyclables and undermine resource efficiency.
- This policy brief recommends policymakers in Asian countries to develop uniform, standardized, and transparent trade standards for plastic scrap in the region

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through international cooperation, and to establish environmentally sound long-term material recycling routes. Thus, this policy brief recommends an internationally harmonized approach for ensuring proper recycling to prevent environmental pollution from internationally-traded plastic scrap.

For policymakers in Japan, this policy brief recommends measures to collect accurate data about the recycling or processing routes for all plastic scrap and the volume recycled or processed in each route. This basic data is essential to develop necessary strategies to expand domestic plastic scrap processing capacity for low-grade plastic scrap and to strengthen the promotion of domestic material recycling within Japan.

I Introduction

Approximately 8.99 million tonnes of plastic scrap were generated in Japan in 2016. About 23% of that was effectively utilized for material recycling, 57% for thermal recycling, and 4% for chemical recycling (PWMI, 2017). Of the plastic scrap utilized for material recycling, approximately 0.68 million tonnes were recycled in Japan, with the remaining 1.38 million tonnes (about 15% of the total plastic scrap generated in Japan) exported to China and Hong Kong for processing and then recycled in China[1]. Plastic scrap that is imported into China is processed into recycled materials (flakes, pellets, etc.) by plastic recyclers[2]. These recycled materials are then compounded depending on their application and used as raw materials when manufacturing plastic products, such as daily consumer goods and industrial parts. Japan is not the only country that has depended on exporting plastic scrap to be recycled in China. The U.S. and Europe have also exported large amounts of plastic scrap to China in the past (Velis C.A, 2014).

However, in July 2017, the Chinese government informed the World Trade Organization (WTO) that it would ban imports of solid waste, such as plastic scrap (WTO, 2017). This resulted in several countries, including Japan, becoming unable to export plastic scrap to China due to Chinese government controls on issuing import licenses and revoking import licenses from companies that violated regulations (Kojima, 2018). For this reason, plastic scrap exporters in Japan switched to exporting this waste to countries in Southeast and East Asia, instead of China[3]. This resulted in the development of new recycling routes whereby plastic scrap is processed in Southeast and East Asia and then transported to China as recycled materials, responding to the high demand for plastic raw materials in China[4].

In 2018, several problems started to emerge, as cargo handling systems in various countries in Southeast and East Asia were unable to keep up with the rapid increase in imported plastic scrap, as well as an increase in the number of violations of acceptance standards[5]. Movements to ban and restrict the import of plastic scrap, began to emerge in these countries, similar to restrictions imposed by China, and it seems that there is now an irreversible drive for stronger import restrictions in various countries. As a result, Japan is losing possible export destinations for plastic scrap for material recycling, and plastic scrap that had been recycled as materials in the past ends up being thermally recycled and processed as waste in Japan, which is not desirable from the viewpoint of resource efficiency.

This policy brief surveys the trends and issues related to international material recycling routes for plastic scrap exported from Japan that have been rapidly changing since 2017, considers potential future developments, and proposes policy recommendations for securing a stable and environmentally sound material recycling process for plastic scrap. This policy brief has been prepared based on the results of interviews with plastic scrap exporters, industrial waste management companies and recycling companies in Japan, and Japanese trade statistics.

2 Overview of China's import restrictions on plastic scrap

On July 18, 2017, the Chinese government notified the World Trade Organization (WTO) that it would ban the import of solid waste, such as plastic scrap, by the end of December 2017 (WTO, 2017). On July 27, the State Council of China issued the "Implementation Plan on Banning Entry of Foreign Garbage and Reforming the Administrative System of Solid Waste Importation (Plan)" (State Council of China, 2017). The plan revised China's system of managing the import of solid waste, and it adopted policies to promote the effective use of environmentally-friendly resources for solid waste generated in China and to prevent environmental pollution and waste from affecting the health of the people (State Council of China, 2017). In compliance with the implementation plan, the Chinese Ministry of Environmental Protection announced revisions to the "Administrative Catalogue of Waste Importation" on August 16, amending the "Catalogue of Banned Import Solid Waste" and "Catalogue of Solid Waste Used as Raw Materials under Restricted Import" (MEP, 2017a). Plastic scrap from daily life was added as a target item in the "Catalogue of Banned Import Solid Waste", which banned imports in principle (MEP, 2017b). In addition, plastic scrap from industry was added as a target item in the "Catalogue of Solid Waste Used as Raw Materials under Restricted Import" (MEP, 2017c). These import bans, restrictions and measures have been in force since December 31, 2017. Subsequently, the Chinese Ministry of Environmental Protection revised the "Environmental Protection Control Standard for Imported Solid Wastes as Raw Materials–Waste and Scrap of Plastics" on December 29, 2017, resulting in a situation where substantial exports of plastic scrap to China are no longer viable, due to the reduction in permitted level of contaminants contained in imported plastic scrap and stricter inspections at ports[6] (MEP, 2017d). The ministry also stated in the "Administrative Catalogue of Waste Importation (revised edition)", issued on April 19, 2018, that a complete ban on imports of plastic scrap from industries that had only been restricted since December 31, 2017, would start after December 31, 2018 (MEE, 2018).

These policy changes, including import bans, restrictions and measures on plastic scrap aim to reduce environmental pollution and human health risks in China from imported waste. Another factor was that customs officials detected foreign contaminants in imported plastic scrap and the use of false import permits by importers (JCESC, 2017). The Chinese government also aimed to strengthen the country's recycling industry and promote the effective use of plastic scrap generated domestically.

Table 1: Trends in China's import regulations for plastic scrap

Month/Year	Contents of Regulations
July/2017	Notification to WTO
	Ban on imports of solid waste, such as plastic scrap, until the end of December 2017
August/2017	Revision of "Catalogue of Banned Import Solid Waste"
	Ban on imports of plastic scrap from daily life from December 31, 2017
	Revision of "Catalogue of Solid Waste Used as Raw Materials under Restricted Import"
	Restrictions on imports of plastic scrap from industries from December 31, 2017
December/2017	Revision of "Environmental Protection Control Standard for Imported Solid Wastes as Raw Materials–Waste and Scrap of Plastics"
	Reduction in permitted level of contaminants contained in imported plastic scrap Stricter inspections at ports
April/2018	Announcement of "Administrative Catalogue of Waste Importation (revised version)"
	Ban on imports of plastic scrap from industries from December 31, 2018

3 Increase in the volume of plastic scrap exports to Southeast and East Asian countries

Since the Chinese government's announcement of restrictions on the import of plastic scrap, a number of plastic scrap exporters have started to export their plastic scrap to alternative destinations instead of China and Hong Kong.

Figure 1 shows the total volume (weight) of plastic scrap exported from Japan (HS code: 3915) to each country in the period from January 2017 to August 2018.

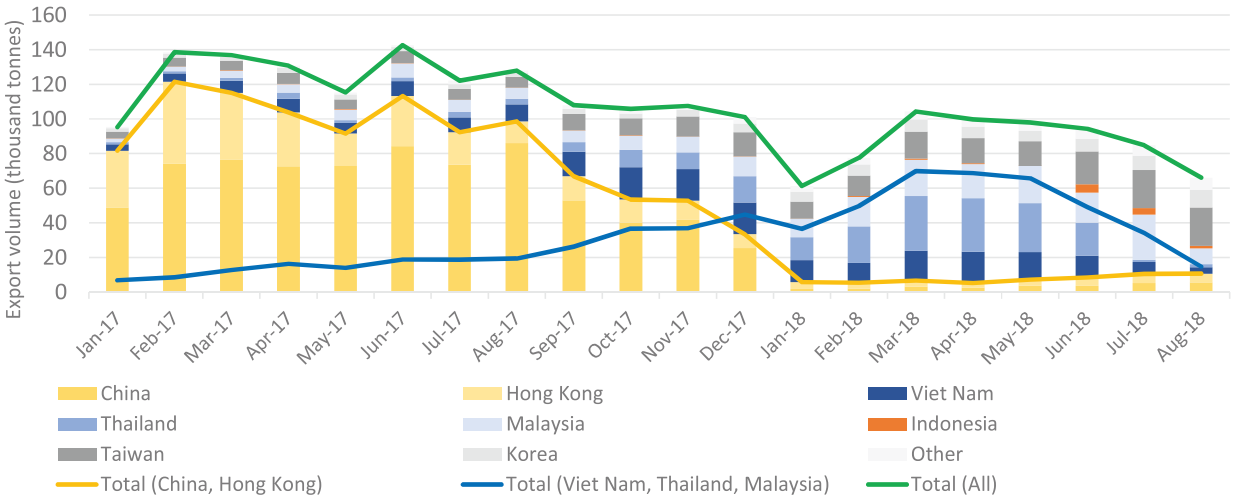


Figure 1: Changes in Japan's exports of plastic scrap
Source: Compiled by the authors based on Trade Statistics of Japan (MOF, 2018)
(Units in figure are 1,000 tonnes)

Although China's ban on imports of plastic scrap has been in force since 31 December 2017, the volume of plastic scrap exported to China and Hong Kong started to decline from around July 2017, after the Chinese government notified the World Trade Organization (WTO) of this change in policy. This decline was due to the fact that nearly all required import licenses were suspended, not updated, or not issued since the Chinese government announced the import ban (Kojima, 2018).

However, the decrease in the volume of exports to China has been accompanied by an increase in exports to other countries in Southeast and East Asia. Particularly in Southeast Asia, there have been remarkable increases in the volume of scrap exports to the three countries of Viet Nam, Thailand, and Malaysia. Although China bans or restricts the import of plastic scrap, it permits the import of processed goods, such as recycled materials. This has resulted in the formation of recycling routes for transport to China via Southeast and East Asian countries, after plastic scrap exported from Japan has been recycled and processed in these countries[7].

There are several reasons for exports of plastic scrap to be concentrated to Viet Nam, Thailand and Malaysia. First, it is easy to transport recycled materials to China because of their close geographic proximity. Second, basic infrastructure (such as electricity and water supply) required for the recycling and processing of plastic scrap is already in place. Third, labour in these countries tends to be relatively inexpensive. Finally, some Chinese plastic recyclers have transferred their recycling plants from China to Southeast Asian countries due to the difficulty of obtaining plastic scrap in China[8].

Separation facilities for plastic scrap have been introduced in Taiwan and Korea due to the implementation of recycling laws and financial assistance to recycling facilities based on the policy

approach of Extended Producer Responsibility (EPR), creating a foundation capable of responding to the increases in imports of plastic scrap. However, individual recycling companies seem to have set strict criteria for accepting plastic scrap[9].

Thus, since July 2017, Southeast and East Asian countries have replaced China and Hong Kong as new destinations for the export of plastic scrap, and as production locations for recycled materials. However, China still remains the country with the largest demand (consumer country) for recycled materials. These recycled materials produced in Southeast and East Asian countries are rarely consumed locally and are exported to China. Interviews confirmed that these materials are used as raw materials for plastics products, in much the same way as before. In other words, it can be said that the route for trading plastic scrap and material recycling, which has until now been mainly between Japan and China, now passes through Southeast Asian countries. However, China remains the final source of demand for recycled materials.

4 Problems related to recycling routes via Southeast and East Asian countries

From 2018, the rapid increase in the volume of imported plastic scrap became problematic for Southeast and East Asian countries. Thailand banned imports completely in June, and Viet Nam and Malaysia temporarily halted the import of plastic scrap in June and July respectively[10]. Taiwan is considering responses that include the suspension of imports for a certain period of time and a review of the acceptance standards for imported plastic scrap[11]. The emerging effects of these import restrictions in each country can be seen in Figure 1.

Thailand instituted a total ban on imports of plastic scrap in June, which has already resulted in a sharp decline in the volume of exports from Japan. Following that, plastic scrap exports to Indonesia increased, creating a new alternative route. Regulations in Viet Nam are provisional, so their possible future trade implications are unclear. Malaysia is considering imposing a levy on imports of plastic scrap in October, which is expected to decrease the volume of imports[12]. Import restrictions in Taiwan are expected to have similar effects.

Import restrictions are being adopted in Southeast and East Asian countries in response to the sudden increase in the volume of plastic scrap imports. Particularly in Southeast Asian countries, domestic waste management and recycling systems are not sufficiently developed (UNEP, 2015). With the added burden of plastic scrap generated in other countries, related environmental pollution has increased, such as odours or leachate from the large piles of plastic scrap. It is not clear whether these countries will institute full scale import restrictions in the future, but governments have adopted a hard line, and stronger restrictions seem likely. At the same time, these countries have started to prioritize waste management and develop related strategies, laws, policies and other measures to develop a circular economy and strengthen environmental sustainability, so stricter standards and import restrictions in Southeast and East Asian countries are likely to continue and grow stronger.

5 Effects on Japan's domestic plastic scrap market

In response to China's import ban, plastic scrap exporters in Japan have shifted their recycling routes to Southeast and East Asian countries, but these countries have not been able to absorb the full amount[13]. Plastic scrap containing contaminants due to insufficient separation and sorting, as well as mixed plastic composed of multiple types of materials (referred to as "low-grade waste materials") may not always be accepted in Southeast Asian countries, so this is being processed domestically in Japan as waste (including thermal recycling). Since China's import ban has been put in place, there has been an influx of low-grade plastic scrap on the domestic market causing an increase in the volume of plastic scrap that has become raw material for refuse derived fuel (RDF) and cement using thermal recycling[14]. Subsequently, plastic scrap that is difficult to utilize in terms of quantity or quality in thermal recycling is processed by incineration or landfilling as industrial waste[15].

Plastic scrap from home appliances generated in Japan can easily be recovered as separate materials through manual disassembly, and plastic scrap for each type of material is now being collected as a result of advances in sorting technologies[16]. For this reason, it is relatively easy for home appliance recycling companies and recycling management companies to develop and secure new sales channels[17], domestically and overseas, to replace China[18]. In this case, the standardization of plastic materials used in home appliances and efforts to display information about the materials contained in parts have been successful.

Plastic scrap from containers and packaging (PET bottles, plastic containers and packaging) collected and recycled through the designated organization route under Act on the Promotion of Sorted Collection and Recycling of Containers and Packaging[19] has not been significantly affected by the policy changes in other countries because domestic sales channels, such as material recycling and chemical recycling, have been established in Japan. For a large amount of plastic scrap collected in other routes[20] which previously had been exported to China, however, it has been necessary to find new sales channels both in Japan and overseas[21].

Figure 2 shows the changes in processing destinations for plastic scrap in Japan for material recycling both before and after China's import ban was put in place (comparison between 2016 and 2018) by source.

Approximately 2.06 million tonnes of plastic scrap were recycled as materials in 2016, with about 1.38 million tonnes of that amount exported mainly to China and Hong Kong. In 2018, plastic scrap was exported to Southeast and East Asian countries, but the volume of exports decreased (see Figure 1). If changes continue along these lines, the estimated volume of exports will be about 1 million tonnes per year. Assuming that the volume of plastic scrap for material recycling did not change between 2016 and 2018, it is estimated that approximately 30% of plastic scrap exported in the past would have had to be processed as waste domestically in Japan (including thermal recycling)[22]. Plastic scrap treated domestically as industrial waste can be expected to include plastic scrap from various sources, such as plastic containers and packaging collected in other routes, plastic scrap from production and processing losses, and flame retardant plastic scrap[23] (flame retardants, PVC sheet and pipe, and wire coating, for example[24]).

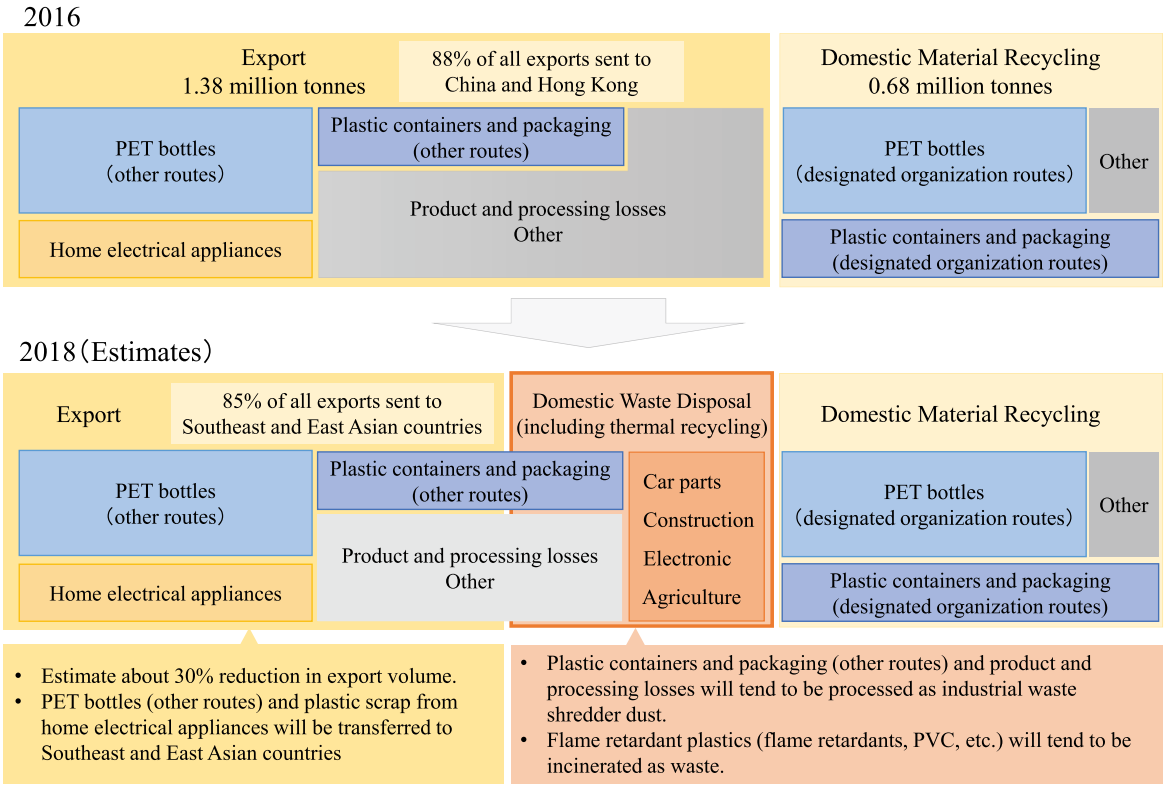


Figure 2: Comparison of processing destinations for material recycling of plastic scrap
(Classified in three processing destinations for export, domestic waste disposal, and domestic material recycling)
Source: Authors developed based on interviews and MOEJ (2016)

6 Implications for future material recycling routes of plastic scrap

As shown in Figure 3, three recycling routes co-exist for material recycling of plastic scrap. First, in Route No.1, plastic scrap is exported from Japan to Southeast and East Asian countries and then ultimately used in China after being processed as recycled materials in each country. Since restrictions on imports of plastic scrap are expected to move forward in each country in the future, thorough pre-processing must be carried out in Japan, such as separation and sorting, so that exported plastic scrap can meet the acceptance standards in each country. In addition, even if Southeast and East Asian countries set arbitrary trade standards, it is likely that destinations for plastic scrap will be concentrated in countries with lower standards, so it is important to set clear and uniform standards for the region. In addition, in order to prevent environmental pollution in importing countries or so-called waste exports, it is also necessary to develop rules and capacities to ensure that imported plastic scrap is properly recycled.

In Route No.2, after plastic scrap is processed into recycled materials in Japan, it is exported to China. Since this may set off a price competition with Southeast Asian countries where labour and energy costs are low, it will be necessary to increase cost competitiveness of recycling and processing by increasing the size and automation of recycling and processing facilities in Japan and establishing efficient plastic scrap recovery schemes. However, when environmentally sound recycling practices reflecting appropriate costs become widespread in Southeast Asian countries, it is expected to relatively increase the cost competitiveness of recycling and processing in Japan.

In Route No.3, recycling and processing, as well subsequent production of recycled plastic products are carried out in Japan and are consistent with the routes discussed as a future direction for domestic resource circulation in Japan. However, due to concerns about

quality and strength, the market for recycled plastic products would be limited, and it will be necessary to consider policy guidance and economic incentives to ensure that recycled materials are utilized in plastic products.

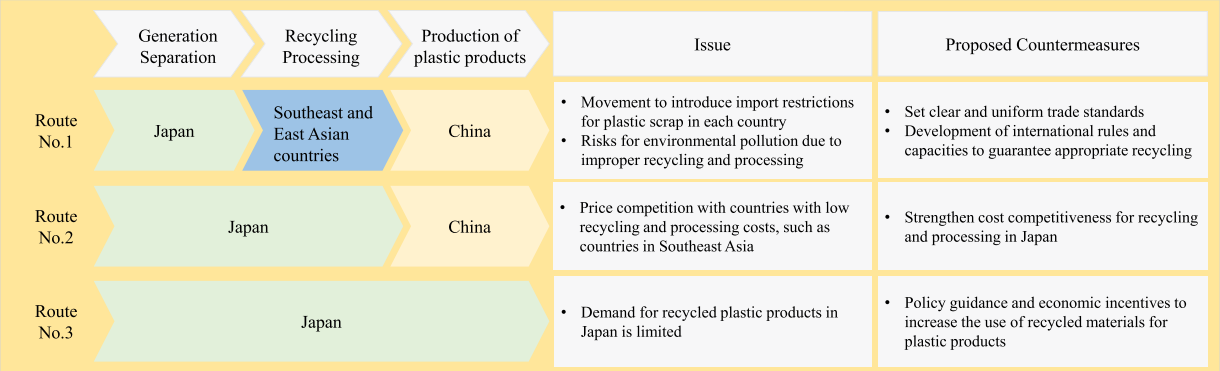


Figure 3: Material recycling routes for plastic scrap

In the short term, it is expected that plastic scrap will be exported to Taiwan, Malaysia and Indonesia as shown in Route No.1, but it is likely that the quality of plastic scrap exported from Japan will need to exceed a certain standard due to strengthening of acceptance standards and stricter enforcement in each country. As a result, high-quality plastic scrap (that can be separated into a single material or shape) will be recycled as materials, while low-grade plastic scrap (that includes contaminants, mixed grade materials, composite materials, etc.) is expected to be processed as waste (including thermal recycling) in Japan.

7 Recommendations to ensure proper material recycling of plastic scrap

Following China's restrictions on the import of plastic scrap, in 2017, recycling processes for plastic scrap were temporarily transferred to Southeast Asian countries. However, considering that emerging economies are now prioritizing waste management and circular economy policies, these countries are likely to continue strengthening their own import restrictions. Shifting the process of recycling plastic scrap to other countries is just a temporary response. Unless a harmonized approach is established to encourage environmentally sound international material recycling, scrap recycling routes are likely to stagnate under these circumstances, thereby undermining resource efficiency. To improve the situation, this policy brief recommends policymakers in the Asian region to develop a harmonized approach as a way to maintain stable international plastic scrap recycling routes while minimizing environmental risks. This policy brief also recommends policymakers in Japan to establish a data collection system on plastic scrap generation, recycling and processing in order to support the consideration of how to strengthen domestic processing capacity and resource circulation.

Recommendations for policymakers in Asian countries

In reality, markets for recycling materials, including plastic scrap, are globalised, and domestic markets in one country cannot be completely isolated. Thus, material recycling is dependent on the flow of international recycling routes which are strongly influenced by market forces. Therefore, Asian policymakers should consider how to achieve environmentally sound recycling and utilization of plastic scrap in the greater Asian region through international cooperation.

Material recycling tends to be implemented in developing countries where costs are lower for labour, infrastructure and environmental countermeasures (UNEP, 2015). However, the risks of environmental pollution are higher. It is recommended to secure

material recycling routes over the long term through clear and harmonised trade standards. The development of common recycling rules for Asian countries, such as an internationally standardized certification system for well-performing companies, development of periodic audits, and ensuring traceability, is also recommended to ensure proper recycling and prevent environmental problems caused by plastic scrap trade.

The need to strengthen international policy coordination for proper recycling has been discussed before (Hashi and Mori, 2005; Hotta et al., 2008; Akenji et al., 2011). In order to do this, an expert working group should be established (similar to the OECD's Working Party on Resource Productivity and Waste (WPRPW)) in Asia to provide policy guidance based on expert analysis.

Recommendations for policymakers in Japan

There is a lack of relevant information and data due to the difficulty of collection and complexity of recycling and processing routes for plastic scrap. Greater knowledge about the recycling and processing routes for all plastic scrap and the volume of material recycled or processed in each route is essential to develop appropriate future responses and the necessary policy instruments to expand domestic processing capacity for low-grade plastic scrap as well as to promote domestic plastic scrap circulation.

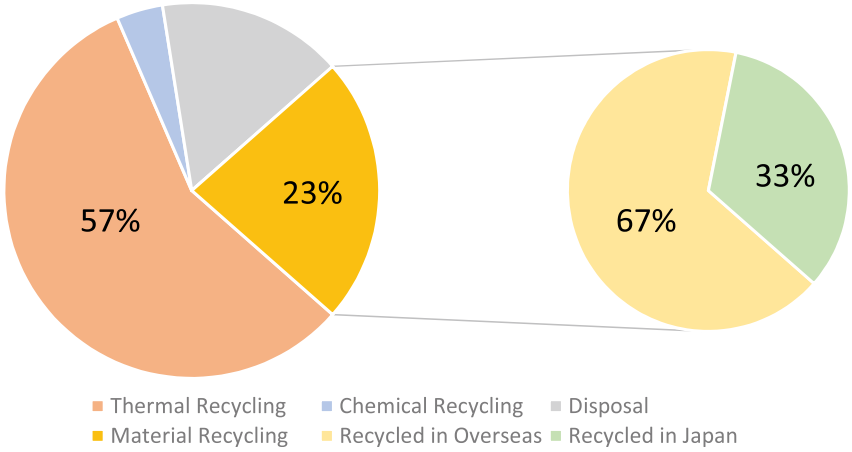
Low-grade plastic scrap processed as waste, including thermal recycling, is expected to increase in the future in Japan, due to stricter import restrictions in other countries. There are industrial waste treatment facilities in Japan, such as cement factories and incineration facilities, that can process plastic scrap to be treated as waste domestically due to import bans to some extent, but they do not have sufficient capacity to deal with all plastic scrap. Analysis of long-term forecast data on the volume of plastic scrap generation and processing is required to encourage capital investment to raise the processing capacity in Japan. Based on the data, investment in technological improvement of sorting facilities could also be encouraged to ensure better quality plastic scrap.

Improvement of domestic circulation of plastic scrap will require setting a target to increase the use of recycled materials in plastic products. Also needed is an increase in the rates of separation and collection of plastic scrap, as well as a target for the material recycling rate of plastic scrap to encourage domestic circulation. Better data collection will be required in order to set appropriate targets.

Import restrictions on plastic scrap will constrain low-grade plastic scrap imports as well as hinder recycling of high-quality plastic scrap which can be recycled as materials. The reasons for the reduction of amount of plastic scrap exported from Japan are currently not fully clear, so further study in this area is necessary to understand quality of plastic scrap that Japan is exporting to other countries.

Over the long term, there is a possibility that demand for recycled materials in China may wane due to economic development. It is also necessary to assume that the value of plastic scrap will change due to technological innovations and changes in the market. In preparation for this situation, the import ban on plastic scrap in China that began in 2017 may present a good opportunity to restructure material recycling routes of plastic scrap which have heavily relied on China, and to consider how to promote domestic material circulation of plastic scrap within Japan as well as more effective international collaboration for policy harmonization and capacity development for material circulation in Southeast and East Asia.

Attachment 1: Breakdown of plastic scrap for recycling and disposal



Plastic recycling method in Japan
Thermal Recycling: cement manufacturing process, incineration with power generation, production of RDF.
Chemical Recycling: monomerization, liquefaction and gasification process, blast furnace.
Disposal: incineration without power generation, landfilling.

Attachment 2: Trends in import restrictions on plastic scrap in countries in Southeast and East Asia

Viet Nam

On May 21, 2018, Saigon Newport Corporation, the largest port management company in Viet Nam, notified their partner shipping companies of the temporary suspension of the acceptance of plastic scrap for the period of June 25 to October 15, 2018[25]. Due to the sudden increase in the volume of plastic scrap accepted, the port was over capacity. Reasons given for the suspension were a decline in the quality of service and interference with the import and export control of regular cargo.

In addition, in response to the rapidly increasing imports of plastic scrap, the Ministry of Natural Resources and Environment and the Ministry of Finance placed restrictions on the renewal and issuance of import licenses. Against this background, inspections conducted by the General Department of Vietnam Customs from January to March 2018 clearly revealed that imports of plastic scrap did not meet quality standards, and imports by unlicensed companies were also found[26].

Although a time limit has been set for the import restrictions, the Vietnamese government is considering measures to prohibit imports over the long term by revising legal systems related to the import of waste.

Thailand

On June 24, 2018, Thailand's Department of Industrial Works issued a notice calling for an immediate ban on imports of plastic scrap[27]. As a result, 26 companies that had been granted permission were banned from importing plastic scrap. The government is conducting inspections of plastic scrap already stored at ports in Thailand and is considering measures to return imports to the exporting country, if it is determined that they do not meet import criteria. The department has also submitted a proposal to the Ministry of Industry for an indefinite ban on imports.

Similar to the cases in Thailand and Viet Nam, a large number of containers loaded with plastic scrap at ports were discovered, and the number of illegal importers was increasing.

Malaysia

The Malaysia Ministry of Urban Wellbeing, Housing and Local Government has notified 114 plastic scrap importers in the country about the suspension of import permits for three months from July 23[28]. Plastic scrap importers can reapply for import permits, but only those that meet newly developed evaluation standards can resume imports. Among the evaluation criteria are the acquisition of compliance letters from the Department of the Environment, acquisition of licenses for import from local governments, and recommendations from the Solid Waste Management and Public Cleansing Corporation. The import of plastic scrap will be stringently controlled by the government. The Ministry of Urban Wellbeing is considering imposing a levy on plastic scrap imports after October 24[29].

In addition, the National Solid Waste Management Department will set up a working group to review the procedures and legislation on the import of plastic scrap.

In the states of Johor Bahru, Kedah, and Selangor in Malaysia, the state governments have taken steps to reject the entry of Chinese plastic scrap recycling and processing companies into the region from around June 2018[30].

Taiwan

According to an announcement by the Taiwanese Environmental Protection Administration on August 13, 2018, there is a movement to regulate plastic scrap imports, and only plastic scrap that has been discharged from a specific source or processed to a single material or shape will be imported through revisions to the legal system related to industrial waste for industrial raw materials[31]. This system will be applied from around October 2018. Although it is unclear how strictly it will be controlled, this may be an indication that the export of plastic scrap to Taiwan will become difficult in the future.

Attachment 3: Recycling Act of Japan

Home Appliance Recycling Act of Japan

Under the Home Appliance Recycling Act, manufacturers are obligated to recycle four items: household air conditioners, televisions (CRT, liquid crystal, and plasma), electric refrigerators/electric freezers, and electric washing machines/dryers. Manufacturers establish designated pickup locations and home appliance recycling plants throughout the country in order to fulfill their recycling obligations. Metals and plastic are recovered at home appliance recycling plants through processing steps that include manual disassembly, crushing, and sorting.

Containers and Packaging Recycling Act of Japan

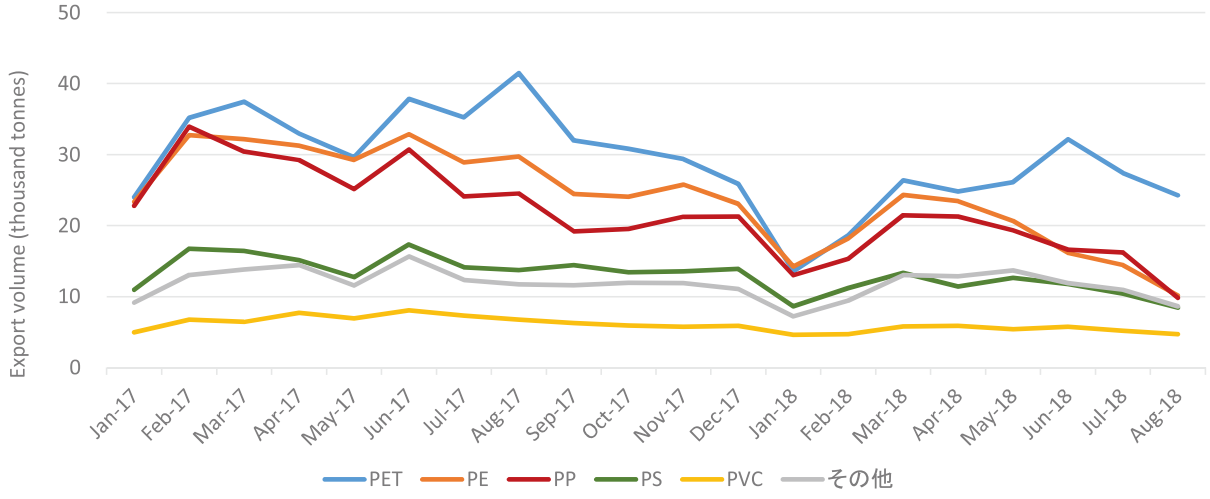
The Containers and Packaging Recycling Act in Japan obligates specified companies (containers manufacturing companies and entities that sell and import products using containers or packaging) to recycle their containers and packaging waste by selecting from three routes as a method to fulfill their recycling obligations: (1) designated organization route, (2) own recycling route, or (3) self-collection route. PET bottles and plastic containers and packaging are recycled mainly through the designated organization route or the own recycling route.

Under the designated organization route, the specified companies pay a consignment fee to a designated organization (Japan Containers and Packaging Recycling Association) and outsource recycling operations. The designated organization selects recycling companies through a bidding process and outsources recycling operations for plastic scrap collected by municipalities.

Under the own recycling route, specified companies receive plastic scrap collected by municipalities and carry out recycling by outsourcing operations to recycling companies.

Attachment 4: Changes in exports of plastic scrap from Japan by the plastic materials

Source: Compiled by the authors based on Trade Statistics of Japan (MOF, 2018)
(Units in figure are 1,000 tonnes)



[1] Refer to Attachment 1: Breakdown of plastic scrap for recycling and disposal.

[2] Referred to as "recycling and processing" in this policy brief.

[3] Interviews with plastic scrap exporters in Japan (July 13, July 17, and September 5, 2018).

[4] The same as above.

[5] Refer to Attachment 2: Trends in import restrictions on plastic scrap in countries in Southeast and East Asia.

[6] These standards have been in effect since March 1, 2018.

[7] Interviews with plastic scrap exporters in Japan (July 13, July 17, and September 5, 2018).

[8] The same as above.

[9] The same as above.

[10] Refer to Attachment 2: Trends in import restrictions on plastic scrap in countries in Southeast and East Asia.

[11] The same as above.

[12] The same as above.

[13] Interviews with plastic scrap exporters in Japan (July 13, July 17, and September 5, 2018).

[14] Interviews with industrial waste management companies in Japan (July - September, 2018).

[15] The same as above.

[16] Refer to Attachment 3: Recycling Act of Japan.

[17] Imports of flame retardant plastics used for cabinets for flat-screen and CRT TVs are banned in China and are among the list of banned items in Viet Nam's import regulations. Although there was difficulty in identifying sales channels overseas, sales channels were found in Japan for these items as raw materials for construction materials.

[18] Interviews with home appliance recycling companies in Japan (July - September 2018).

[19] Refer to Attachment 3: Recycling Act of Japan.

[20] The same as above.

[21] Interviews with plastic scrap exporters in Japan (July 13, July 17, and September 5, 2018).

[22] Since it is unlikely that the processing capacity of recycling domestically will increase sharply, it is assumed that the volume of plastic scrap that will be recycled as materials domestically will not change from previous figures.

[23] Interviews with industrial waste management companies in Japan (July – September, 2018).

[24] Trade statistical data by the plastic material shows that exports of PET are stable although exports of others (PE, PP, PS, PVC) are decreasing. Refer to Attachment 4: Changes in exports of plastic scrap from Japan by the plastic materials.

[25] Colin Staub. 2018. Vietnamese terminals will suspend scrap plastic imports. Plastics Recycling Update. May 23, 2018. https://resource-recycling.com/plastics/2018/05/23/vietnamese-terminals-will-suspend-scrap-plastic-imports/ (accessed October 14, 2018).

[26] Colin Staub. 2018. Why Vietnam is shutting out scrap plastic. Plastics Recycling Update. May 31, 2018. https://resource-recycling.com/plastics/2018/05/31/why-vietnam-is-shutting-out-scrap-plastic/ (accessed October 14, 2018).

[27] Tanakorn Sangiam. 2018. Thailand halts imports of electronic, plastic waste. National News Bureau of Thailand. June 24, 2018. http://thainews.prd.go.th/website_en/news/news_detail/WNECO6106240010004 (accessed October 14, 2018).

[28] AP on importation of plastic waste for 114 factories revoked. The Sun Daily. July 24, 2018. http://www.thesundaily.my/news/2018/07/24/ap-importation-plastic-waste-114-factories-revoked (accessed October 14, 2018).

[29] Dawn Chan. 2018. Govt to impose levy on import of plastic waste starting next month. New Straits Times. September 25, 2018. https://www.nst.com.my/news/government-public-policy/2018/09/414831/govt-impose-levy-import-plastic-waste-starting-next (accessed October 14, 2018).

[30] Johor rejects proposals from China firms to be build waste recycling centres. The Sun Daily. August 1, 2018. http://www.thesundaily.my/news/2018/08/02/johor-rejects-proposals-china-firms-be-build-waste-recycling-centres (accessed October 14, 2018).

[31] EPA. 2018. Amendment of regulation on industrial waste for industrial raw material (in Chinese). Environmental Protection Administration, Executive Yuan, August 13, 2018. https://enews.epa.gov.tw/enews/fact_Newsdetail.asp?InputTime=1070813113749 (accessed October 14, 2018).

• References

Akenji, L., Hotta, Y., Bengtsson, M. and Hayashi, S. 2011. EPR policies for electronics in developing Asia: a phase-in approach. IGES Policy Brief #14, Hayama, Japan: Institute for Global Environmental Strategies

MEE. 2018. Administrative Catalogue of Waste Importation (revised edition) (in Chinese). No.6, 2018. Ministry of Ecology and Environment, April 19, 2018.

MEP. 2017a. Administrative Catalogue of Waste Importation (in Chinese). No.39, 2017. Ministry of Environmental Protection, August 16, 2017.

MEP. 2017b. Catalogue of Banned Import Solid Waste (in Chinese). Ministry of Environmental Protection, August 16, 2017.

MEP. 2017c. Catalogue of Solid Waste Used as Raw Materials under Restricted Import (in Chinese). Ministry of Environmental Protection, August 16, 2017.

MEP. 2017d. Environmental Protection Control Standard for Imported Solid Wastes as Raw Materials–Waste and Scrap of Plastics (in Chinese). Ministry of Environmental Protection, December, 2017.

MOEJ. 2016. Toward Reduction of Natural Resource Consumption and Environmental Burden by Material Recycling (in Japanese). Ministry of the Environment, Japan. March, 2016.

MOF. 2018. Trade Statistics of Japan. Dataset category0: Trade Statistics Data for Japan, Dataset category1: Commodity by Country, Dataset category2: Export. The Portal Site of Official Statistics of Japan. Ministry of Finance, Japan. 2018. http://www.customs.go.jp/toukei/info/tsdl_e.htm (accessed September 28, 2018).

JCESC. 2017. Weekly China Environmental Regulation/Business Report (in Japanese). No.37, 2017, Japan-China Environmental Service Center Co., Ltd, 2017.

Hashi, T and Mori, H. 2005. Networking International Recycling Zones in Asia - Towards improvement of resource efficiency and solutions for environmental problems in developing countries -. IGES Policy Brief #1, Hayama, Japan: Institute for Global Environmental Strategies.

Hotta, Y. Elder, M., Mori, H. and Tanaka, M. 2008. Policy Considerations for Establishing an Environmentally Sound Regional Material Flow in East Asia, The Journal of Environment & Development, 17(1), pp. 26–50. doi: 10.1177/1070496507312562.

Kojima, M. 2018. Strengthen China's Restriction on Imported Recyclable Scrap and Its Impacts (in Japanese). The Environmental News, June 13, 2018.

PWMI. 2017. The Status of Production, Disposal, Recycling and Processing of Plastics 2016 (in Japanese), Plastic Waste Management Institute. December, 2017.

State Council of China. 2017. Implementation Plan on Banning Entry of Foreign Garbage and Reforming the Administrative System of Solid Waste Importation (Plan) (in Chinese). No.70, 2017. State Council of China, July 27, 2017.

UNEP. 2015. Global Waste Management Outlook. UNEP, 2015. https://wedocs.unep.org/bitstream/handle/20.500.11822/9672/-Global_Waste_Management_Outlook-2015Global_Waste_Management_Outlook.pdf.pdf?sequence=3&isAllowed=y (accessed October 18, 2018).

Velis C.A. 2014. Global recycling markets - plastic waste: A story for one player – China. Report prepared by FUELogy and formatted by D-waste on behalf of International Solid Waste Association - Globalisation and Waste Management Task Force. ISWA, Vienna, September, 2014. https://www.iswa.org/fileadmin/galleries/Task_Forces/TFGWM_Report_GRM_Plastic_China_LR.pdf (accessed October 11, 2018).

WTO. 2017. Notification for Adjusted to the List of Prohibited Solid Wastes (in Chinese). World Trade Organization, July 18, 2017.

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