

Market Situation and Potentials in Japan for Plastic Recycling Technologies

September 28, 2023

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List of Abbreviations

EPR	Extended producer responsibility
GHG	Greenhouse Gas
JCBA	Japan Customs Brokers Association
JCPRA	Japan Containers and Packaging Recycling Association
JEFMA	Japan Environmental Facilities Manufacturers Association
JETRO	Japan External Trade Organization
JISC	Japanese Industrial Standards Committee
METI	Ministry of Economy, Trade and Industry
MoEJ	Ministry of Environment Japan
NEDO	New Energy and Industrial Technology Development Organization
OECD	Organisation for Economic Co-operation and Development
PCR	Post-consumer recycling
PET	Polyethylene terephthalate
PIR	Post-industrial recycling
PMI	Plastic management index
PWMI	Plastic Waste Management Institute
RDF	Refuse Derived Fuel
REX	European Commission as a Registered Exporter
RPF	Refuse Paper & Plastic Fuel
SDGs	Sustainable Development Goals
SME	Small and medium sized companies

1. Executive Summary

Japan is the second-largest consumer of single-use plastic packaging in the world after the USA. This is partly due to the country's natural conditions, such as high humidity, which have encouraged a strong plastic packaging culture. Moreover, Japanese consumers value cleanliness and well-presented packaging, making it a social norm in retail. However, the impact of China's 2018 ban on plastic waste imports has had a major impact on Japan, with the country generating 9 million tons of plastic waste annually and exporting 1.5 million tons in 2017, including 900,000 tons to China. While Japan turned its exports to other Southeast Asian countries, stricter import regulations reduced overall exports. Concerns about global marine pollution made the situation worse. Japan has set up an emergency fund to support local waste recyclers primarily through incineration. Nevertheless, thermal recycling at 57% highlights the need for more sustainable waste management solutions.

Against this background, Japan is actively seeking innovative technical solutions to tackle the problem of plastic waste. European waste management companies, especially those specializing in sorting and recycling plants and materials recovery, have already built a solid reputation in the country over the past years. The Japan-EU Free Trade Agreement (JEFTA) further promotes cooperation between Japan and European companies. Given the uncertainties in other markets, Japan is an attractive partner for cooperation and offers a unique opportunity for EU companies to expand in the Japanese market.

Compared to Europe, Japan's plastics recycling market is relatively small with 8.24 million tons of plastic waste in 2021. Japan reports a recycling rate of 82%, but it's important to note that 57% of this recycling involves thermal methods such as incineration with energy recovery. The remaining 25% is neither recycled nor reused but transformed into other products or returned to raw materials. Surprisingly, 70% of non-recycled plastic is exported abroad and recycled there, resulting in an actual recycling rate of less than 10%. Looking ahead to 2035, the domestic market for recycled plastics and materials is expected to reach 504 billion yen¹, while the market for recycled plastics alone is expected to hit 355.3 billion yen², more than doubling its current size.

However, the Japanese plastics recycling market is growing due to the global push towards recycling-oriented practices. Key factors behind this growth include the 2030 Agenda for Sustainable Development, focusing on the SDGs and the ban on plastic exports. In 2022, Japan introduced the Green Growth Strategy Through Achieving Carbon Neutrality, an integrative approach that considers the entire plastic lifecycle. Challenges come as Japan ranks second in plastic container and packaging waste per capita, facing import restrictions from other Asian countries. To address these issues, the government has implemented a milestone strategy based on the 3Rs (reduce, reuse, recycle) and renewable resources. The Plastic Resource Circulation Act of 2022 further promotes a circular economy in three phases: design manufacturing, sales-delivery, and disposal-collection-recycling. This has spurred demand for innovative recycling technologies, driven by tighter government regulations.

¹ 504 billion Yen = 3,238.878 million Euro (by currency rate of July 26, 2023: 1 Euro = 155.62 Yen)

² 355.3 billion yen = 2,283.157 million Euro (by currency rate of July 26, 2023)

To find suitable distribution partners in Japan, industry associations, trade organizations like the Japan External Trade Organization, IHKJ, or participating in trade fairs could be consulted. European companies have various options entering the Japanese market, including wholesale companies like Mitsubishi, Mitsui, and Sumitomo, which have strong networks but limited marketing support. Smaller specialized trading companies offer proactive sales approaches within specific industries, though they might lack the reputation of larger counterparts. Some European-origin trading companies like Correns, Irisu K.K., and SKW Asia operate in Japan, capitalizing on cultural understanding and customer service. Additionally, partnering with independent sales representatives or agents provides industry expertise and networking opportunities, but after-sales services might be limited. Alternatively, establishing a presence in Japan through an office or subsidiary demonstrates commitment and is valued by Japanese clients. However, this approach demands substantial investment and time to cultivate relationships.

The Japanese market for waste management and recycling is promising but also challenging. Language barriers are a significant obstacle for EU companies doing business in Japan. To be successful, thorough preparation, reliable local partners and adapted communication strategies are crucial. It is strongly recommended to hire a trained Japanese interpreter for discussions and negotiations. European companies can sell products through different channels: through wholesalers, SME trading companies, trading firms of European origin, sales representatives, agents, consultants, or by opening their own office in the country. Building strong relationships, customer focus, a positive corporate image, quality products and strong customer service are essential for success in the Japanese market.

Japan has long been recognized for its advanced waste management practices, innovative technologies, and commitment to environmental sustainability. There are several competitive Japanese plastic recycling companies that have made significant contributions to the circular economy and sustainable waste management. From a European perspective, companies such as Mitsubishi Material, Mitsui Chemicals, Sekisui Chemicals, JFE Engineering, MATEC Inc., Daiei Kankyo Group, Taka Pla, Planic stand out as key players in the Japanese plastic recycling industry. These companies exemplify the innovation, technological advancements, and commitment to environmental sustainability.

Customers are expecting high quality and an intensive after-sales-service, which should best be carried out by a specialized Japanese service company. The European company can find service companies via their Japanese partner (sales agent / distributor) and at a waste management fair in Japan. The leading fair for recycling is the yearly N-Expo in Tokyo. Another possibility to inform potential customers about their products is to participate at conferences and seminars in Japan. Collaboration is a key element of Japan's recycling industry. Companies actively collaborate with government agencies, research institutions, and other stakeholders to share knowledge, expertise, and best practices. These collaborative efforts promote continuous improvement, technological innovation, and the development of efficient recycling processes.

2. Scope of the Report

This report is addressed to mainly small and medium-sized companies in Europe who offer innovative technology in the plastics recycling sector. It presents a comprehensive overview of the Japanese plastics recycling market including current trends, drivers as well as business potentials and challenges for European companies seeking to develop or strengthen their positions in the Japanese market.

The political strategies and targets related to plastic waste management and emission reduction are described in part 3.

The current size, structure and trends in the Japanese market for plastics recycling is summarized in chapter 4, including information on the current way of plastic waste sorting and collection.

Issues related to market access such as distribution channels and regulations are characterized in part 5. This chapter also included some relevant trade fairs and some possible obstacles to market entry.

In part 6, some of the main market players (companies, universities/research institutes, associations) are listed up.

The report concludes with a short analysis of the business opportunities, main challenges, and key success factors in chapter 7.

Thus, the report strives to provide practical information and valuable recommendations for EU-based small and medium-sized enterprises engaging into the plastics recycling market which helps them to estimate the potential of Japan's plastics recycling market for their specific innovative technology or service, and to capitalize on existing business opportunities.

The report is based on an extensive desk research of relevant publications and media, including publications by Japanese ministries, government bodies and research institutions in Japanese language. Furthermore, information sources such as specialist journals, economic journals, company reports and websites, statistical websites, etc. were integrated to complement the study.

3. Political Strategy and Targets

Japan has set the ambitious target to reach net zero emissions by 2050 and to reduce Japan’s greenhouse gas emissions by 46 % below 2013 levels by fiscal year 2030 (instead of the previously announced 26%).³

Japan’s Medium- and Long-term Targets for GHG Reduction

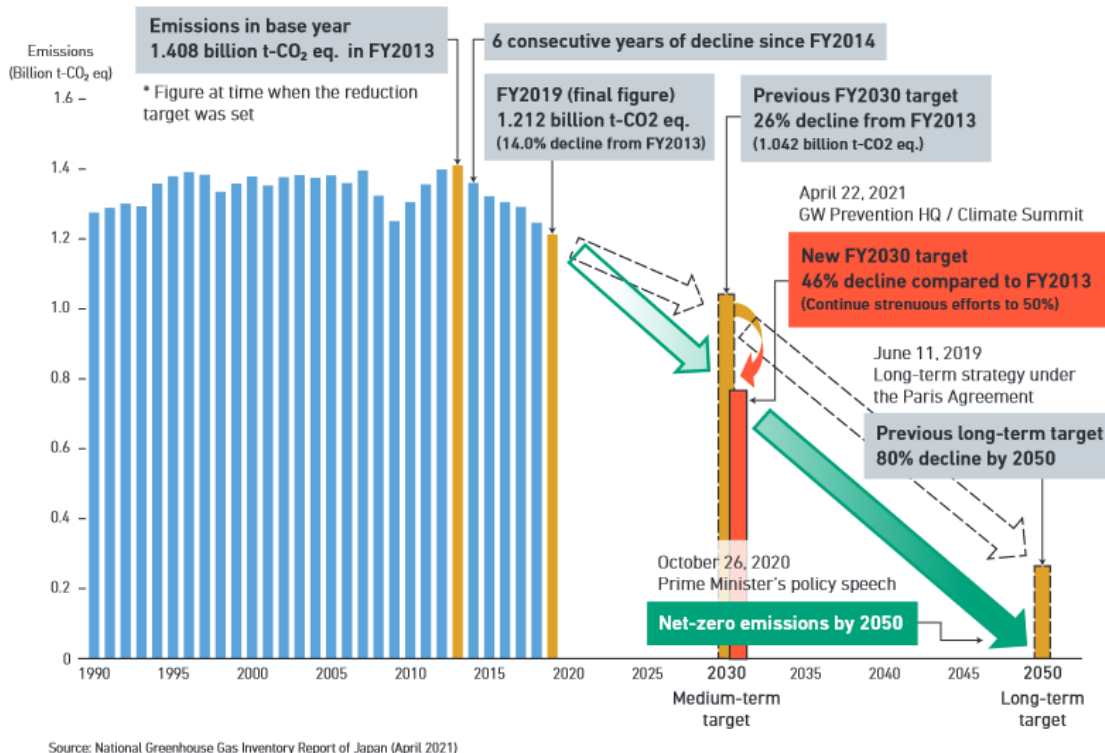


Fig. 1: Japan’s targets for GHG reduction, 2021, National Greenhouse Gas Inventory Report, 2021

Improving carbon and material recycling is also on the agenda of the government program. Carbon-free synthetic fuels are to be made commercially available by 2040. Another important government target is to reduce the manufacturing cost of plastics obtained through artificial photosynthesis to 20 % by 2030. The goal is to reduce costs to the level of existing materials by 2050.

³ Ministry of the Environment (2021), Annual Report on the Environment, the Sound Material-Cycle Society and Biodiversity in Japan 2021

According to the Plastic Waste Management Institute, the breakdown of waste plastic emissions in Japan (824 million tons) is as follows (see also figure below).

- First, used products is 92.1%, and Production and processing losses are 650,000 tons, 7.9%.
 - In detail of the used products is Packaging containers and other containers 4.01 million tons, which accounts for 48.7%.
 - Electric and electronic equipment, electric wires and cables, machinery, etc. is equivalent to 1.48 million tons, 17.9%.
 - Household goods/clothing, footwear, furniture, toys, etc. are 730,000 tons, and 8.9%.
 - Building materials, transportation, agriculture, forestry, and fisheries also account for a certain ratio.

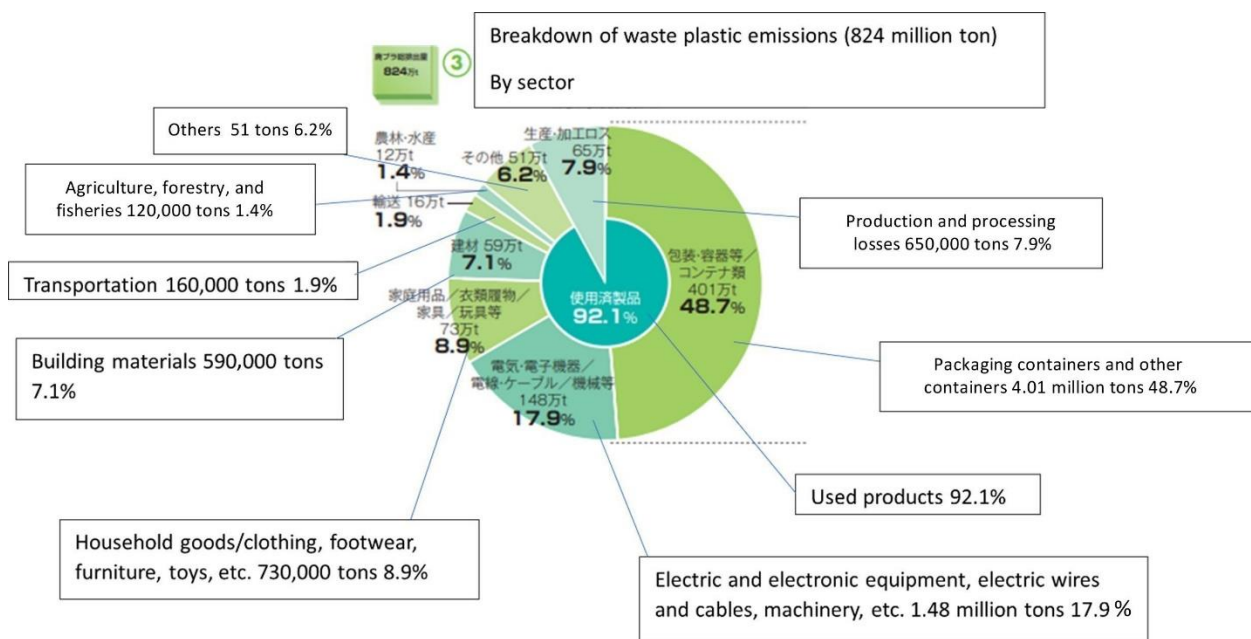


Fig. 2a: Breakdown of waste plastic emissions by sector, Plastic Waste Management Institute, 2023

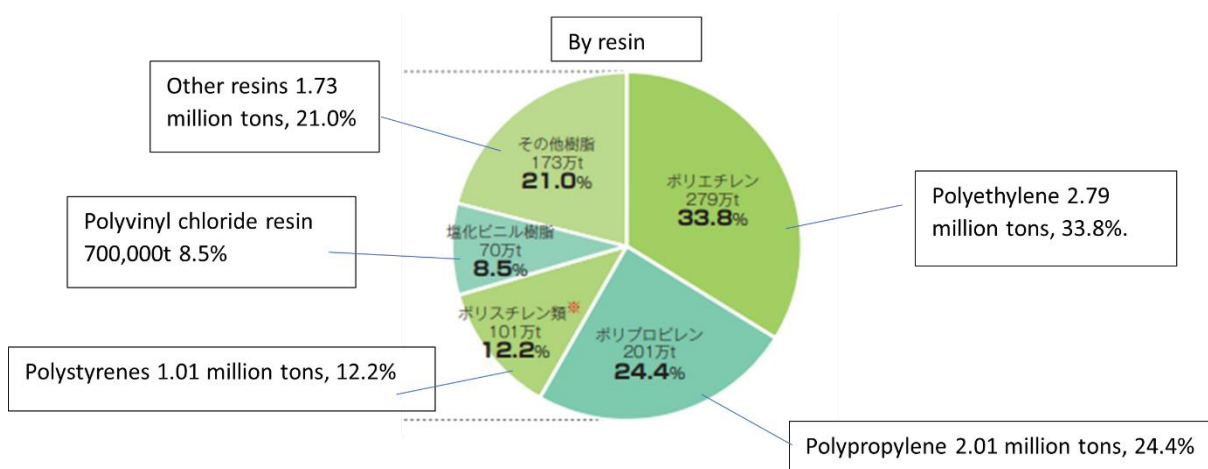


Fig. 2b: Breakdown of waste plastic emissions by resin, Plastic Waste Management Institute, 2023

As part of the Green Growth Strategy Through Achieving Carbon Neutrality in 2050, which entered into force in 2022, the Japanese government also proposed a new strategy for plastic recycling.⁴ It addresses the whole lifecycle of plastics and involves all stakeholders. Besides carbon emission reduction there are two reasons for this strategy. Firstly, low rate of plastic waste usage and environmental pollution from marine plastics are the huge problem. Secondly, Japan has faced to challenges as the second highest amount of plastic container and packaging waste per capita and import restrictions in Asian countries. To change this situation, the government proposed a strategy named “3R and Renewables” including specific milestones:

- Reduce: Cumulative suppression of 25% of single-use plastics by 2030
- Reuse, Recycle: Reusable/recyclable design by 2025
- Reuse/recycle 60% of containers and packaging by 2030
- Effective use of 100% of used plastics by reuse and recycling etc. by 2035
- Recycling and Bio-based Plastics: Double the use of recycled content by 2030 / introducing about 2 million tons of bio-based plastics by 2030

In order to achieve the milestones, the government declared the Plastic Resource Circulation Act in 2022⁵. This act, including more detailed and new policy measures for transition to a circular economy through advancing circulation of resources, ranges three phases: design manufacturing, sales -provision, and discharge – collection – recycling. Three key factors are regarded as key factors for the success of the Plastic Resource Circulation Act and these three phases:⁶

- Develop guidelines for Design for the Environment for manufacturers.
- Set criteria for retailers and service providers to reduce single-use plastics.
- Manufacturers and retailers develop a plan to collect and recycle their used products.

In addition to the 3 phases mentioned above, the government formulated five specific requests to businesses and local governments in order to make the laws more feasible and easier to implement:

- Design Guideline and Certification System for Products Using Plastics
- Voluntary collection and recycling by manufacturers and distributors
- Rationalization of the use of certain plastic products.
- Emission control, recycling, etc. by emitting companies.
- Separate collection and recycling of plastic-used product waste by municipalities.

⁴ Ministry of Economy, Trade and Industry METI (2021), Green Growth Strategy Through Achieving Carbon Neutrality in 2050

⁵ Japanese Government, Ministry of the Environment MoEJ (2022), The Plastic Resource Circulation Act

⁶ Mizuho Research & Technologies (2021), Current status and challenges of domestic plastics recycling

4. Market Situation

a. Market Volume

Compared to Europe, the plastics recycling market in Japan is not large. The reason behind this is that 3/4 of the waste plastic generated in Japan is still incinerated and not recycled. However, the future potential is huge as Japan has the second largest amount of plastic waste per capita in the world. Japan's plastic recycling volume is still lower than that of Europe, the EU, and the US. Japan's official recycling rate for plastics is 87%. However, 62% of the plastics are recycled by thermal recycling, that means incineration with energy recovery⁷. This could be a good reason to believe that Japan is a "recycling powerhouse" when in fact it is an "incineration powerhouse"⁸.

The amount of waste plastic in 2021 is 8.24 million tons according to Japan Plastic Recycling and Reuse Association. The breakdown by sector of the 8.24 million tons of total waste plastic discharged was 4.01 million tons, or 48.7%, for packaging, containers, etc., 1.48 million tons, or 17.9%, for electrical and electronic equipment, wires and cables, machinery, etc., and 730,000 tons, or 8.9%, for household goods, clothing and footwear, furniture, toys, etc.⁹.

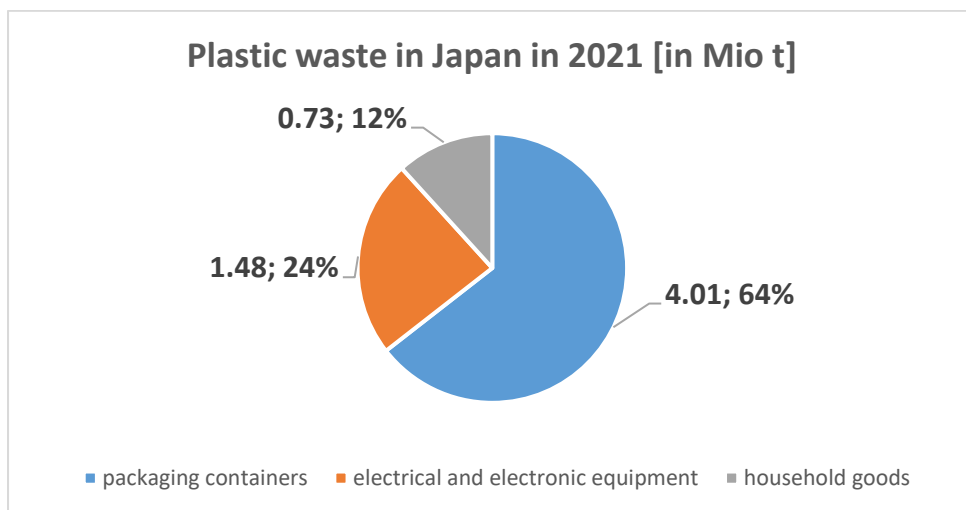


Fig. 3: "Plastic Products", Association for the recycling and reuse of plastics, 2022

The amount of industrial waste is the same amount for 10 years. Plastic waste accounts for 1.9 % of industrial waste. As for general waste, it has gradually decreased since 2000 around 14 million tons. In 2022, plastic waste shares 14.7 % of general waste. According to the research of Japan Plastic Waste Recycling Association¹⁰, both plastic production and consumption are declining. Plastic production became 87,000 tons less and plastic consumption declined 94,000

⁷ Japan Association for Recycling Plastic Products (2023), Basic Knowledge of Plastic Recycling

⁸ Ministry of Environment (2018), Domestic and International Situation Surrounding Plastics

⁹ Japan Association for Recycling Plastic Products (2022), Status of Production, Disposal, Recycling, and Treatment and Disposal

¹⁰ Japan Association for Recycling Plastic Products (2022), Status of Production, Disposal, Recycling, and Treatment and Disposal

tons compared to the previous year. The effective utilization rate of waste plastics increased by 1% from 2019. According to Fuji Economy, as of 2021, the domestic market for recycled plastics and materials are around €1.2 billion, of which recycled plastics account for €1 billion.¹¹

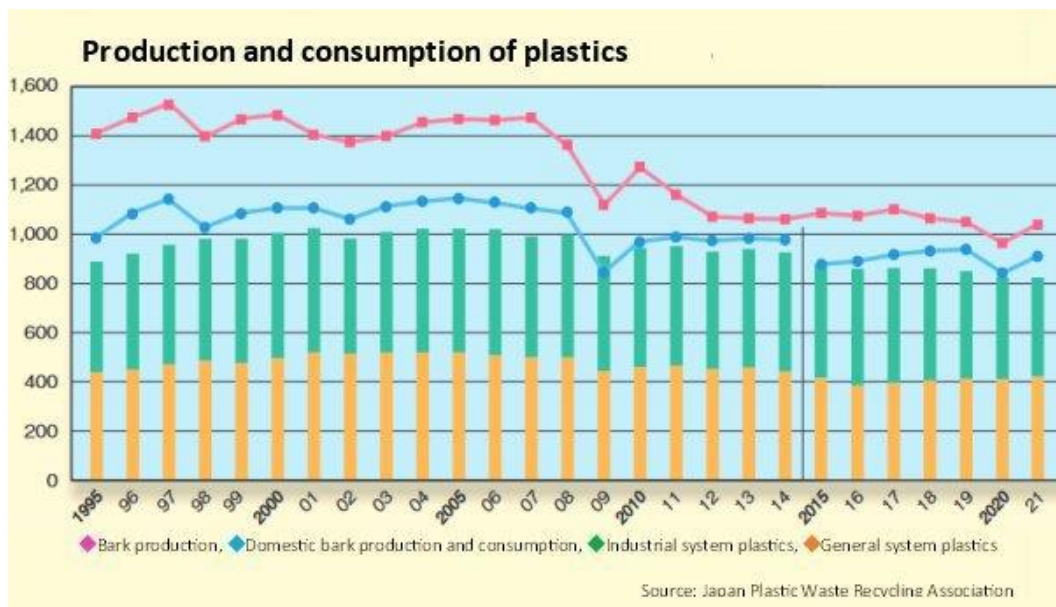


Fig. 4: Development of plastic production and consumption, Japan Plastic Waste Recycling Association, 2023.

The production volume of polyethylene and polypropylene is the largest in Japan and both are the two most widely produced plastics, which together account for almost half of the total production. This is due to the fact that about 40% of all plastic are polyethylene and polypropylene, and these two alone account for almost half of all plastic applications. To be more specific, by resin, polyethylene accounted for 33.8% of the total amount of waste plastic discharged at 2.79 million tons, polypropylene 24.4% at 2.01 million tons, polystyrene 12.2% at 1.01 million tons, and polyvinyl chloride 8.5% at 700,000 tons in 2021 according to Japan Plastic Recycling and Reuse Association.

b. Market Developments and Trends

Japan's plastics recycling market is developing due to the growing global movement toward a recycling-oriented society. In particular, the 2030 Agenda for Sustainable Development, which is centred on the SDGs (Sustainable Development Goals), and the export ban on plastics have had a significant impact on the market. This global trend has also put Japan at the forefront of innovative waste management practices, and the plastics recycling industry has made great strides in recent years.

¹¹ Fuji Keizai Group (2022), New Outlook for Circular Plastics and Materials Market in 2022

In 2035, the domestic market for recycled plastics and materials is projected to be 504 billion yen¹², and the market for recycled plastics is projected to be 355.3 billion yen¹³. Both are expected to more than double in size compared to today. The forecast is that more and more companies are adopting the product from an environmental perspective, and the expansion will be driven by material recycling plastics.¹⁴

There have been some key factors that contributed to a growing plastic recycling market:

1. Regulatory Framework

Japan has implemented comprehensive legislation and regulations to promote recycling. The Waste Management and Public Cleansing Law, introduced in 1970, provided the legal foundation for waste reduction, recycling, and proper waste disposal. Over time, the law has been revised and expanded to include specific targets for recycling rates, waste separation requirements, and extended producer responsibility (EPR) schemes. These regulations have incentivized businesses and individuals to participate actively in recycling activities.¹⁵

The main Regulations and laws related to plastic recycling are:

2000 Act for Establishing a Recycling-Oriented Society

The act is aiming a society in which the consumption of natural resources is reduced and the burden on the environment is minimized as much as possible through the control of waste generation and its proper recycling and disposal.

With the above law as a basic framework, the Law for Promotion of Effective Utilization of Resources, Waste Disposal and Public Cleansing Law, and individual recycling laws have been enacted. Individual recycling laws consist of 6 categories, Containers and Packaging Recycling Law, Home Appliance Recycling Law, Food Recycling Law, Construction Recycling Law, Automobile Recycling Law, Small Home Appliance Recycling Law.¹⁶

Containers and Packaging Recycling Law

The law was enacted in June 1995 and came into full effect in April 1997 to reduce the volume of containers and packaging waste, which accounts for about 20-30% of the weight and 60% of the volume of household waste. It promotes recycling and other measures, and the effective use of resources. The regulation places the responsibility for waste reduction and recycling on the shoulders of consumers, municipalities, and businesses, respectively. Consumers must play a role in reducing waste through rational selection of containers and packaging, as well as in sorting and discharging waste containers and packaging. Businesses that manufacture or use the containers covered by this law are obliged to recycle them. Businesses may outsource the performance of their recycling obligations to the Japan

¹² 504 billion Yen = 3,238.878 million Euro (by currency rate of July 26, 2023: 1 Euro = 155.62 Yen)

¹³ 355.3 billion yen = 2,283.157 million Euro (by currency rate of July 26, 2023)

¹⁴ Fuji Keizai Group (2022), New Outlook for Circular Plastics and Materials Market in 2022

¹⁵ Ministry of the Environment: <https://www.env.go.jp/recycle/waste/laws.html>

¹⁶ Ministry of Environment (2022), Legal System for Forming a Recycling-Oriented Society

Containers and Packaging Recycling Association by paying a recycling fee to the association. Municipalities must establish a sorted collection plan and take necessary measures for the sorted collection of containers and packaging waste within the municipality's area.¹⁷

Based on this, businesses are required by law to display an identification mark on containers and packaging to facilitate sorted collection. In the case of plastics, it is recommended to add a "material label" in addition to the identification mark because of the wide variety of materials used.¹⁸

2022 Law for Promotion of Resource Recycling of Plastics

The New Plastics Recycling Promotion Act aims to promote resource recycling of plastics and stipulates necessary measures at each stage of plastic-using products from design and manufacture, sale and supply, to discharge, collection, and recycling. Designers and manufacturers are required to design in accordance with the "Guidelines for the Design of Plastic-Used Products" established by the government. Specifically, these guidelines include reducing the amount of plastic used, reusing parts, designing products that are easy to recycle, substituting materials other than plastic, and using recycled plastic and bioplastics.¹⁹

Some have criticized these regulations as vague and low standards. Higher targets have been set in other countries, such as Korea's goal of reducing single-use items (disposables) by at least 35% by 2022.

2. Public Awareness and Participation

One of Japan's notable achievements in recycling development is its emphasis on public awareness and participation. The Japanese government, along with local municipalities, has undertaken extensive education campaigns to promote waste separation and recycling practices among citizens. Educational programs, community workshops, and public events have helped raise awareness about the importance of recycling and the benefits of sustainable waste management. As a result, recycling has become ingrained in Japanese society, with citizens actively participating in recycling efforts.²⁰

3. Technological Advancements

Japan's plastic recycling industry has benefited from continuous technological advancements. Advanced European sorting technologies, such as near-infrared spectroscopy and artificial intelligence-based systems have been adopted to efficiently separate different types of plastics. These advancements have increased the overall recycling rates and improved the quality of recycled plastic, making it more suitable for a wide range of applications.²¹

4. Collaboration and Industry Initiatives

Japan has fostered strong collaborations between government, industry, and academia to promote plastic recycling. Various industry-led initiatives have been established. Organizations such as the Japan Plastic Industry Federation and

¹⁷ Ministry of Environment, (2023), What is the Containers and Packaging Recycling Law

¹⁸ Japan Plastic Recycling and Reuse Association (2022), Basic knowledge of plastic recycling

¹⁹ Ministry of the Environment (2022), Act on Promotion of Resource Recycling Related to Plastics

²⁰ Ministry of the Environment, Press release

²¹ New Energy and Industrial Technology Development Organization NEDO (2020), Press release

The Council for PET Bottle Recycling play pivotal roles in coordinating efforts, setting recycling targets, and implementing collection and recycling systems. These collaborative initiatives create a conducive environment for knowledge sharing, technology transfer, and the development of best practices in plastic recycling.

Major trends of the plastic recycling market in Japan are as follows:

1. Increasing Recycling Rates

Japan has been successful in steadily increasing its plastic recycling rates over the years little by little. The country has set ambitious targets to reduce plastic waste and promote recycling. Efforts are focused on enhancing collection systems, improving sorting technologies, and expanding the range of recyclable materials.²²

2. Chemical Recycling Technologies

Chemical recycling has emerged as a prominent trend in Japan's plastic recycling landscape. The country has made significant investments in developing advanced chemical recycling technologies to address the challenges posed by complex and contaminated plastics. Techniques enables the production of high-quality recycled materials. however, this method hasn't been penetrated yet.

3. Circular Economy Approaches

The concept of the circular economy is a driving force in Japan's plastic recycling trends. The country recognizes the need to shift from a linear "take-make-dispose" model to a circular system that promotes resource conservation and minimizes waste generation. Japan is investing in research and development to enhance recycling technologies, promote eco-design principles, and encourage product stewardship.²³

These trends highlight Japan's commitment to sustainable waste management, technological innovation, and resource conservation.

c. Main Applications in Japan

Plastic waste is composed as follows: PET plastic bottle accounts for 14%, plastics except for containers and packaging account for 14% as well, and Styrofoam/ tray have 3%. Most of the plastic waste is from other plastic containers and packaging, which accounts for 69%.

²² Japan Plastic Recycling and Reuse Association (2022), Basic knowledge of plastic recycling

²³ Ministry of Economy, Trade and Industry (2020), Green Growth Strategy for Carbon Neutrality by 2050

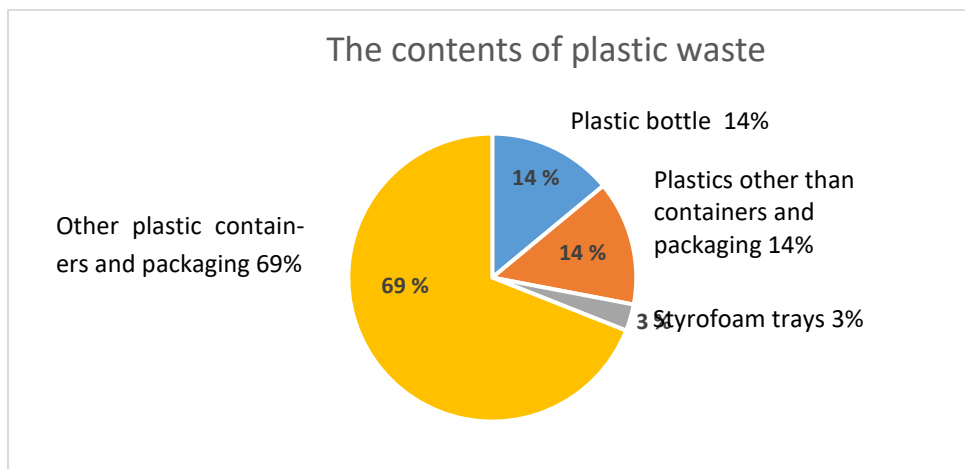


Fig. 5: The contents of plastic waste, Plastic Waste Management Institute, 2023

The production ratio of plastics by application is as follows: Of the 5.68 million tons produced, film and sheet will account for 43.2%, almost half. Containers accounted for 15.0%, machinery and equipment parts 11.8%, and pipes and fittings 7.2%. Other products, although smaller in number, include daily necessities and sundries, construction materials, foam products, boards, reinforced products, and synthetic leather.

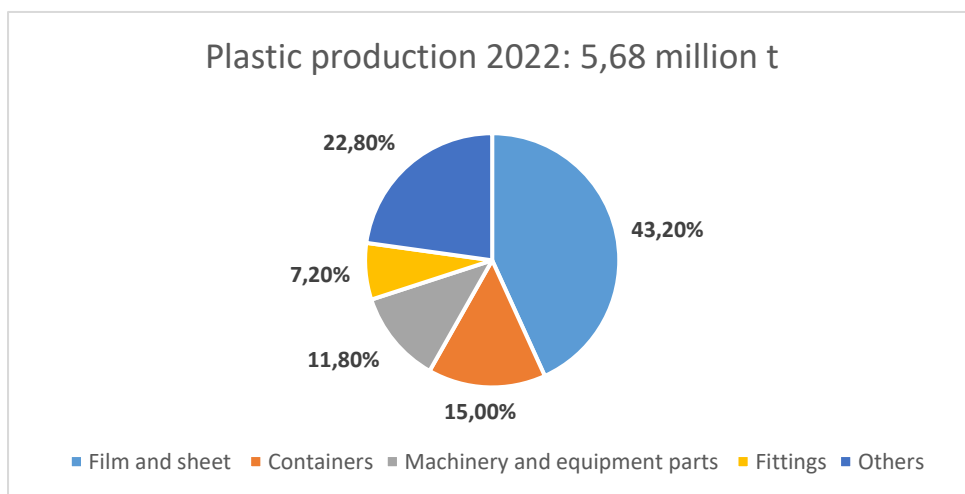


Fig. 6: Plastic production, Plastic Waste Management Institute, 2023

In recent years, the trend toward higher functionality in containers and packaging has made significant progress in Japan, and multilayered films are now used in many products. For these chemical or thermal recycling is recommended. The effective utilization rate has been increasing year by year. Material recycling refers to the reuse of waste plastics as raw materials for similar applications after shredding, dissolving, or other treatment. According to the international standard ISO 15270, it is classified as Mechanical Recycle. Chemical recycling is the process of chemically decomposing waste plastics back to their raw material state and reusing them as raw materials for products. According to the international standard ISO 15270, it is classified as Feedstock Recycle. Thermal recycling (energy recovery) refers to the use

of incineration energy to generate electricity by using waste plastics as the primary or auxiliary fuel. (It does not include incineration to reduce volume as a pre-process for landfill disposal.)

Japan's plastic utilization rate for 2019 is 85%. The breakdown is 21% for material, 3% for chemical, and 63% for thermal recycling as of 2021. ²⁴

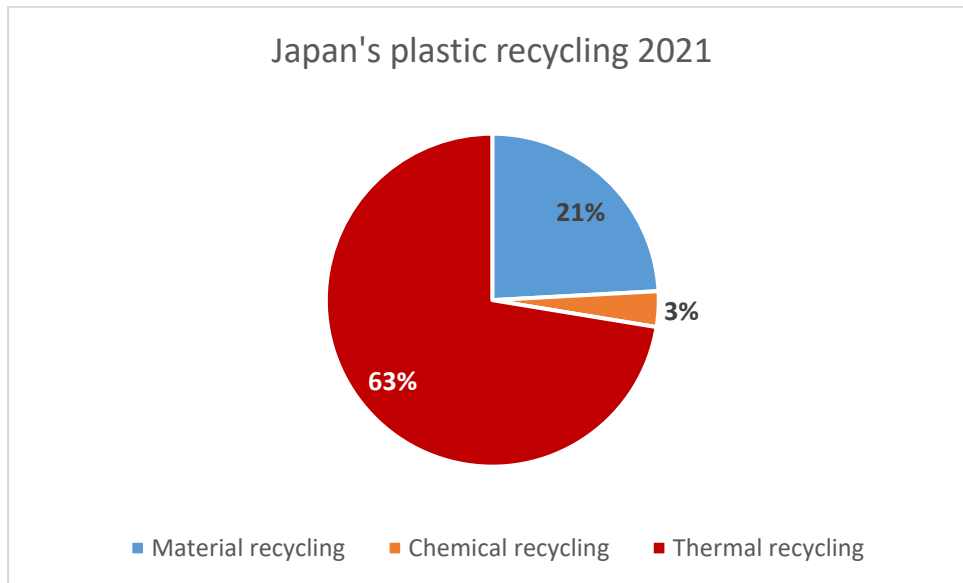


Fig. 7: Types of plastic recycling, Plastic Waste Management Institute, 2023

In addition to the viewpoint of the way of recycling, it can also be divided into two categories by raw material and sorting source: post-consumer recycling (PCR) and post-industrial recycling (PIR). Post-consumer recycling (PCR) is the process of collecting used products from the market and converting them into recycled resources. Post-industrial recycling (PIR), on the other hand, refers to the recycling and reuse of materials generated in the product manufacturing process prior to market release; in JIS Q 14021 (ISO 14021), it is called pre-consumer recycling.

It can also be divided into two categories, horizontal recycling and cascade recycling, depending on the product being reborn. Cascade recycling is a method in which one recovered product is recycled into a different product from the original one through recycling. Thus, various types of recycling exist and can be incorporated into each product.

d. Main Processes in Japan

There are three categories of plastic recycling: material, chemical and thermal recycling. The recycling methods, shares, and total amounts of plastics processed are shown in Tab. 1. ²⁵

²⁴ Japan Association for Recycling Plastic Products (2022), Status of Production, Disposal, Recycling, and Treatment and Disposal

²⁵ Japan Plastic Recycling and Reuse Association (2022), Basic knowledge of plastic recycling

Category	Way of recycling	Share
Material recycling	Recycled plastic	21%
	- Converted to plastic raw materials - Converted to plastic products	
Chemical recycling	Raw material/Monomerization	4%
	Blast furnace reductant	
	Coke oven chemical feedstock	
	Gasification/Oilification (Chemical feedstock)	
Thermal recycling (Energy recovery)	Gasification, Oilification (Fuel)	2%
	Cement raw materials/fuel	24%
	Refuse power generation	31%
	RPF (Refuse derived paper and plastics densified Fuel)	4%
	RDF (Refuse Derived Fuel)	

Tab. 1: Type of plastic recycling, Plastic Waste Management Institute, 2023

The effective utilization of plastic went up to 87% in 2022, against 58% in 2005. In terms of disposal and recovery methods, mechanical recycling increased to 1,770 kt (+40 kt; +2%), chemical recycling increased to 290 kt (+20 kt; +7%), and energy recovery (thermal recycling) increased in total to 5,110 kt (+20 kt; ± 0%).

(1) Material recycling

The technology was born in the 1970s and there are currently several hundred manufacturers in Japan. Material recycling used to for mainly industrial waste plastics. Recycled processed products made from waste industrial plastics have had problems, such as reduced physical properties and unstable quality. However, this has been overcome by improving the quality control of the waste plastics used as raw materials, blending technology, and manufacturing and processing technology.

(2) Chemical Recycling

In raw materials and monomerization, plastic bottles are made of plastic bottles. Plastic bottles are recycled into fibre and sheets. A technology was developed to make PET resin by returning it to the intermediate stage of synthesis. Used PET bottles are chemically decomposed into raw materials and monomers (depolymerization), and then converted into PET resin. In April 2004, the bottle-to-bottle business was launched with the approval of the Ministry of Health, Labor and Welfare.

Blast furnace feedstock technology allows waste plastic to be used in the blast furnace as a reductant instead of coke. Waste plastics collected from factories and households are cleaned and granulated before being blown into the blast furnace together with coke.

In the coke oven chemical feedstock technology coke, hydrocarbon oil, and coke oven gas are produced from the volatile components generated when waste plastics are steamed. As a result, 40% hydrocarbon oil as a chemical raw material, 20% coke as a reducing agent for blast furnaces, and 40% coke oven gas used for power generation are made.

Gasification technology turns waste plastic into gas, which is then used as a raw material for the chemical industry. The synthesis gas is turned into hydrogen, methanol, ammonia, acetic acid, and other raw materials for the chemical industry.

Oil conversion technology converts waste plastic back into oil. However, the process is an endothermic reaction that requires the supply of energy, and many facilities withdrew from the process in the mid-2000s due to its high cost and the risk of explosions and other hazards.

(3) Thermal recycling

Waste plastics have been collected and disposed of at the discretion of local authorities, but in 2005 the Ministry of the Environment has decided to unify the previously mixed standards for sorting as “combustible waste” and no landfill was allowed. In FY2020, the Tokyo 23 Wards Cleaning Association recorded a total of 1.25 billion kWh of electricity generated, 750 million kWh of electricity sold, 351,000 GJ of heat supplied (for a fee) and 9.6 billion yen of income from electricity and heat sales.

Thermal recycling methods include the use of waste incineration heat, waste incineration power generation, cement raw materials/fuel conversion, and solid fuel conversion (RPF, RDF). Of these, waste incineration power generation has attracted renewed attention in recent years as an important energy source. The use of waste as energy is steadily increasing. Approximately 70% of all waste incineration plants in Japan (1,056 sites) use some form of surplus heat used for heating, bathing, and hot water pools. As of 2020, there were 387 waste incineration plants with power generation facilities, accounting for 37% of all waste incineration plants, with a total power generation capacity of 2,079 MW. The total amount of electricity generated was 10,153 GWh (+163 GWh compared to the previous year), which was enough to power approximately 2.38 million households.

5. Market Access

a. Plastic Waste Collection System

The plastic waste collection system in Japan is quite advanced. It differs depending on the source of plastic waste (household/domestic waste and industrial waste) as outlined in figure 8:

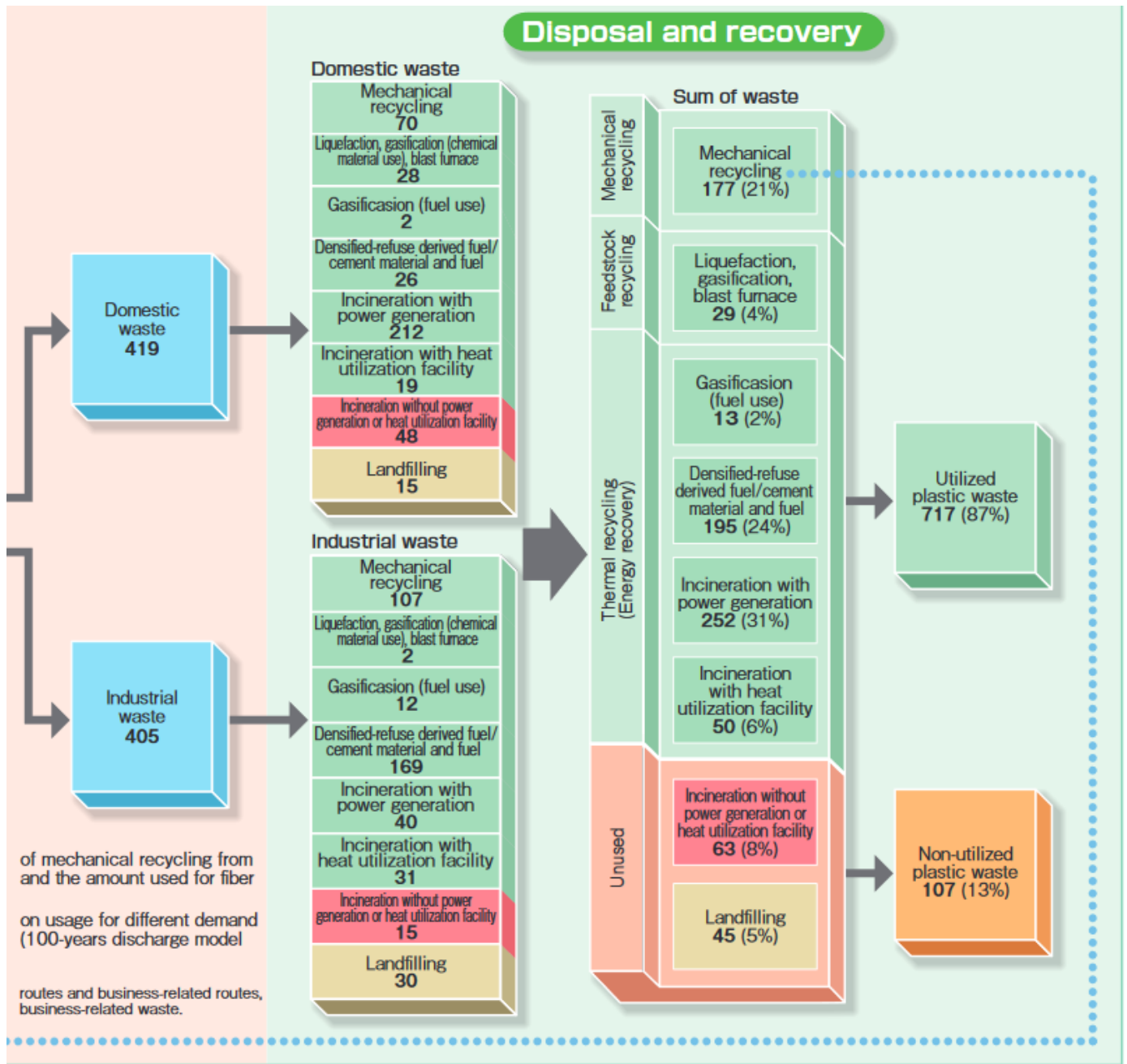


Fig. 8: Flowchart of plastic waste recycling 2022, Plastic Waste Management Institute JAPAN (PMWI), 2022; Figures in kt.

(1) Household Waste

Municipalities are responsible for the separate collection, sorting and cleaning of packaging waste in compliance with legal requirements. 90% of all municipalities handed over their waste to the Japan Containers and Packaging Recycling

Association (JCPRA)²⁶ in 2017. Plastic containers and packaging collected at designated storage facilities are handed over to the municipalities. Transportation to the factory is performed by a recycling company.

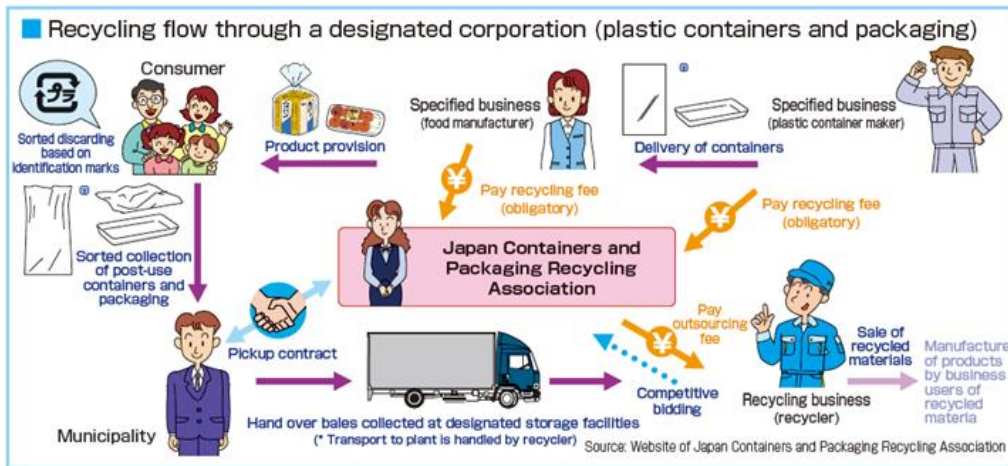


Fig. 9: Recycling flow, Japan Containers and Packaging Recycling Association (JCPRA), 2023

(2) Industrial Waste

The collection and recycling system for industrial waste is functioning as follows.

Company → JCPRA → Recycler

The JCPRA acts as a liaison between companies and recycling companies. The JCPRA outsources recycling to external companies, which it selects through competitive bidding. The outsourcing costs, in turn, are transferred to the companies via a quantity-dependent fee.

The recycling business operator recycles and sells the recycled products. The products include plastic products such as pallets, recycled resin, and fake wood, as well as coke oven chemical feedstock, blast furnace reductant, pyrolysis oil, and synthetic gas, which are sold to plastic moulding manufacturers. As of 2020, the number of operators in the channel of collection and transportation of waste plastics is 535. And the number of businesses for intermediate treatment and recycling is 284 nationwide.²⁷

²⁶ JCPRA = The Japan Containers and Packaging Recycling Association

²⁷ METI, Ministry of the Environment (2020), Results of the Recycling Industry Fact-finding Survey

b. Distribution channels

Japanese recycling plant providers (see chapter 6a) often use their contacts to regional/local administration or to feedstock (i.e., plastic waste) suppliers. They are often part of a company group such as Mitsubishi or Sumitomo and can make use of the synergies within the group to successfully diversify their business.


Especially in the beginning, a partnership with domestic players (see chapter 6) is a good way to get started. Such a partnership can take various forms: feedstock arrangements, technology alliances, joint ventures, value chain alliances.

For the sales of their technology, there are several options: wholesale companies, small and medium-sized trading companies, trading companies of European origin, sales representatives, agents or consultants as well as an own office in Japan. To find suitable distribution partners it is recommendable to consult respective industrial associations or institutions promoting foreign trade such as the Japan External Trade Organisation ²⁸, the EU-Japan Centre for Industrial Cooperation, or through trade fairs.

Japanese wholesale companies enjoy a good reputation in Japan and have extensive networks. However, they often have limited interest in pure trading and distribution and offer minimal marketing and sales support. Smaller trading companies often specialize in specific industry sectors. These companies usually have excellent access to a specific industry sector and take a proactive sales approach. However, they do not necessarily enjoy the same reputation as general trading companies and often operate more regionally than nationally. Also, many of these companies may have little experience with foreign suppliers, which can lead to cultural misunderstandings and conflicts due to different expectations. Trading companies of European origin operating in Japan for a long time offer the advantage of avoiding the obstacle of cultural differences between Europe and Japan. Additionally, these companies are bringing to the fore the customer service that is highly valued in Japan. Independent sales representatives and agents have extensive industry experience and a strong network and support business development in Japan. However, they usually cannot provide after-sales services.

Another option is to establish an independent presence in Japan, which gives them full control over market strategy, personnel and other aspects. This approach shows the European company's commitment to Japan and is highly appreciated by Japanese clients. However, this step requires a significant initial investment and time to build business relationships.

Some examples of trading companies are:

	Company	Correns Corporation
	HQ	1-8-7,Roppongi,Minato-ku,Tokyo,106-0032,Japan
	Website	https://www.correns.co.jp/
	Products	Representative of European machine and component manufacturers in Japan, e.g. machines for plastic recycling

²⁸ JETRO Japan External Trade Organisation

	Company	K.K. IRISU (C. ILLIES & CO., LTD.)
	HQ	Irisu Building, 3-12-18 Kamiosaki, Shinagawa-ku, Tokyo 141-0021
	Website	https://www.irisu.jp/en/
	Products	Sales partner for the conception, implementation, and after-sales support of machinery, equipment, and complex processing systems for manufacturing industries

	Company	SKW East Asia Ltd.
	HQ	Sanbancho KS Bldg. 6F, Sanbancho 2, Chiyoda-ku, Tokyo 102-0075, Japan
	Website	https://www.skwea.co.jp/en/company/
	Products	The Company's line of business includes the wholesale distribution of durable goods.

	Company	Shonan Trading Co., Ltd
	HQ	5F, Tobu Yokohama 2-BLDG 2-15-1, Kitasaiwai, Nishi-ku, Yokohama 220-0004 Japan
	Website	https://www.shonantrading.com/index.html
	Products	Agent for a wide variety of foreign manufacturers. Their focus is especially on importing and distributing film production processes and plastic recycling technologies through Japan.

	Company	Sojitz Machinery Corporation
	HQ	2F, Marunouchi Center Bldg., 6-1, Marunouchi 1-Chome, Chiyoda-ku, Tokyo 100-0005 Japan
	Website	https://www.sojitz-mac.com/en/division/environment_lifestyle/
	Products	A trading company for industrial machinery. The Environment and Lifestyle Industrial System Division can offer extruders, granulation equipment, coating systems, and conversion systems made by not only Japanese manufacturers but also European manufacturers,

 SANKO SHOJI LTD.	Company	SANKO SHOJI LTD.
	HQ	Yodoyabashi Mitsui Bldg., 4-1-1, Imabashi, Chuo-ku, Osaka, 541-0042, Japan
	Website	https://www.sankojapan.co.jp/english/profile/
	Products	Advanced Engineering-oriented Trading Company that offers different plants and systems

c. Regulations

Import/Export of machinery to Japan

When it comes to importing machinery to Japan, the importing company wishing to distribute foreign machinery in Japan does not require any special licenses or operating permits. For the European company wishing to export to Japan, it is recommended to register with the relevant customs office of the European Commission as a Registered Exporter (REX).

In this way, the declaration of origin for the recycling plant components can be drawn up if it corresponds to the original. Under the EU-Japan Economic Partnership Agreement (EU-Japan EPA), a declaration of origin from a registered exporter is used as proof of preference when exporting from the EU. It is advisable to check the current export regulations and procedures at the German customs office research. More information and a list of custom brokers available depending on the arrival port/airport in Japan can be obtained from the Japan Customs Brokers Association (JCBA). The EU-Japan EPA Helpdesk can also provide further information.

Technical standard JIS

The Japan Industrial Standard (JIS) is issued by the Japanese Industrial Standards Committee (JISC) which underlies the jurisdiction of METI. JISC works closely with the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC). Although JIS is not mandatory and in many cases is very close to ISO, Japanese customers prefer to stick to JIS-certified products because the certification process may include certain special Japanese regulations or specifications that apply only to the Japanese market. Especially for foreign companies, the application process can be difficult due to specific regulations and language barriers. However, there are organizations in Japan that can assist foreign companies with the application process, e.g. the Japan Quality Assurance Organization (JQA).

Law on plastic recycling

Article 1 of the Law for Promotion of Resources Recycling of Plastics, which went into effect on April 1, 2022, states as its premise that it is necessary to ensure that the construction and operation of recycling plants do not harm the health of the citizens living in the vicinity. For example, air pollution from amortization of thermal recycling and noise.²⁹

The characteristics of recycling plants that are easily accepted can be seen from two government-funded projects: As a project to promote the introduction of advanced CO₂-saving recycling and other facilities, the government supports the introduction of CO₂-saving recycling and other facilities. The Demonstration Project for Establishing a Recycling System for Plastics and Other Resources to Support a Decarbonized Society supports the conversion to alternative materials to plastics and their implementation in society.³⁰

d. Trade Fairs

The leading trade fair for recycling, the N-Expo in Tokyo, and some other fairs that include related topics in the field of recycling are listed below:

- N-Expo (Tokyo),
May 22 – 24, 2024, Tokyo Big Sight, annual
<https://www.showsbee.com/fairs/N-Expo-Japan.html>
- Plastic Resource Recycling Fair (in the frame of the Resource Circulation Expo in Tokyo)
March 16 - 18, 2022, Tokyo Big Sight, annual
<https://www.resource-expo.jp/en-gb/about/plastic.html>
- Techno-Frontier (Tokyo)
<https://www.jma.or.jp/tf/en/index.html>
July 24 – 26, 2024, Tokyo Big Sight, annual
<https://www.jma.or.jp/tf/en/>
- World Smart Energy Week (Tokyo),
February 28 – March 1, 2024, Tokyo Big Sight, annual
<https://www.wsew.jp/spring/en-gb/about.html>
- Circular Economy EXPO (Tokyo)
February 28 – March 1, 2024, Tokyo Big Sight, annual
<https://www.circulareconomy-expo.jp/en-gb/about.html>
- EcoPro (Tokyo),
December 2023, Tokyo Big Sight, annual
<https://messe.nikkei.co.jp/ep/>

²⁹ Ministry of the Environment (2022), Act on Promotion of Resource Recycling Related to Plastics

³⁰ Ministry of the Environment (2022), Act on Promotion of Resource Recycling Related to Plastics


- FUKUSHIMA Renewable Energy Industrial Fair (REIF, Fukushima),
October 2024, Big Palette Fukushima, annual
2023 fair: <https://reif-fukushima.jp/en/>
- Smart Factory Japan (Tokyo),
January 24 – 26, 2024, Tokyo Big Sight, annual
<https://www.fiweek.jp/hub/en-gb/about/sfe.html>
- Maintenance / Resilience TOKYO (Tokyo, Osaka)
July 24 - 26, 2024, Tokyo Big Sight, annual
<https://www.cantonfair.net/event/12347-maintenance-resilience-tokyo>
- Plastic Japan Tokyo (Chiba) / Osaka, twice a year
October 4 - 6, 2023, Makuhari Messe, Chiba
May 8 - 10, 2024, INTEX Osaka
<https://www.material-expo.jp/hub/en-gb/exhibit/pla.html>
- IPF Japan Tokyo (Chiba)
November 28 – December 2, 2023, Makuhari Messe (Chiba), once every 3 years
<https://www.jetro.go.jp/en/database/j-messe/tradefair/detail/121990>

6. Major players

a. Technology Suppliers / Competitors


Japan has long been recognized for its advanced waste management practices, innovative technologies, and commitment to environmental sustainability. Japan is home to several competitive plastic recycling companies that have made significant contributions to the circular economy and sustainable waste management. From a European perspective, companies such as Morita, Ebara, Sanko Shoji, Mitsubishi Materials, and Mitsubishi Chemical stand out as key players in the Japanese plastic recycling industry. These companies exemplify the innovation, technological advancements, and commitment to environmental sustainability that are crucial in addressing the global plastic waste crisis.

	Company	Morita Group
	HQ	Keihanshin-Midosuji Building 12F, 3-6-1 Dosho-machi, Chuo-ku, Osaka-shi, Osaka, 541-0045, Japan
	Website	https://www.morita119.com/en/products/recycling/
	Products	Recyclable waste processing plant, non-recyclable waste processing plant, combustible bulky waste processing plant, incombustible bulky waste processing plant; shredders, shears, etc.

 EBARA CORPORATION	Company	Ebara Corporation
	HQ	11-1, Haneda Asahi-cho, Ota-ku, Tokyo 144-8510, Japan
	Website	https://www.ebara.co.jp/en/eep/index.html
	Products	Plastics incineration plants, waste treatment plants, waste-to-energy

 SANKO SHOJI LTD.	Company	SANKO SHOJI LTD.
	HQ	Yodoyabashi-Mitsui Bldg., 4-1-1, Imabashi, Chuo-ku, Osaka, 541-0042, Japan
	Website	https://www.sankojapan.co.jp/english/products/recycle.html
	Products	Recycle plants, e.g. for plastic waste and PET bottles

 MITSUBISHI MITSUBISHI MATERIALS	Company	Mitsubishi Materials
	HQ	3-2-3, Marunouchi, Chiyoda-ku, Tokyo 100-8117 Japan
	Website	https://www.mmc.co.jp/corporate/en/
	Products	Incineration plants, non-ferrous recycling technology, circular resource recovery, etc.

 MITSUBISHI CHEMICAL	Company	Mitsubishi Chemical Corporation
	HQ	1-1, Marunouchi 1-Chome, Chiyoda-ku, Tokyo 100-8251, Japan
	Website	https://www.mcgc.com/english/index.html
	Products	Plastic waste chemical recycling

There are several reasons why Japanese plastic recycling companies are competitive for European companies.

1. Technological Advancements

Japanese companies have invested significantly in research and development to develop advanced recycling technologies. They have installed innovative sorting, processing, and chemical recycling techniques – often from European manufacturers.

2. Quality and Reliability

Japanese plastic recycling companies are known for their commitment to delivering high-quality recycled materials. They adhere to strict quality control measures and meet stringent standards, ensuring that the recycled materials they produce are of superior quality. This commitment to quality and reliability has earned them a reputation for excellence in the industry, making them competitive not only in the domestic market but also in the global arena.

3. Cooperation

In addition to the strengths of each company, it can be said that the strength of the Japan market lies in collaboration. Major chemical manufacturers are collaborating horizontally to accelerate research and development of chemical recycling. In addition, there have been cases where a large-scale alliance system has been created in which 22 companies across industries participate in the development of technologies and the creation of a comprehensive system. As an example of horizontal, industry-academia, and venture collaboration, Sumitomo Chemical and Sekisui Chemical have developed chemical recycling technology in cooperation with universities, private companies, and public-private funds. Research began in 2020 to promote joint research to synthesize methanol from carbon dioxide and production technology to convert combustible waste into ethanol.³¹

An example for a leading Japanese plastic recycling company is Planic, one of the largest manufacturers of recycled plastics in Japan. It was established in December 2018 as a joint venture of Veolia Japan K.K. Planic accepts plastic products from both municipalities and companies. First, the plastic collected from factories and municipalities is sorted. Dust and metals are removed. Then, it is crushed and pulverized, followed by heavy-liquid sorting. The liquefied material is next subjected to electrostatic sorting to produce PS and ABS. The polystyrene and ABS resins are sold to a converter. A portion of the electrostatically sorted material is then subjected to light-liquid sorting, passed through a combiner, and extruded to be reborn as recycled plastic. The recycled plastic is then shipped to plastic product manufacturers.

³¹ 1 Sumitomo Mitsui Banking Corporation (2021), Recycling of waste plastics

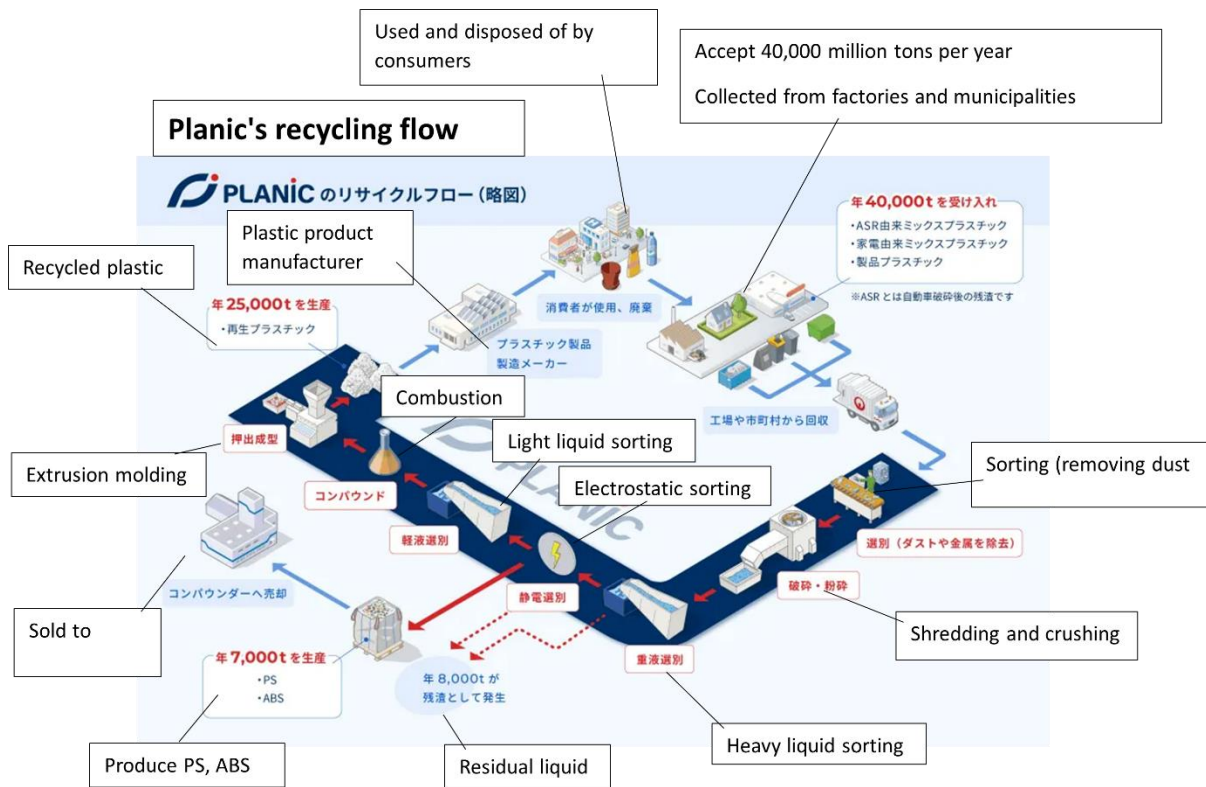


Fig. 10: Recycling flow at the Planic plastic recycling plant, Planic, 2023

b. Plastic Recycling Suppliers

Japanese plastic recycling traders, e.g. Daisaku Trading, NK Plastics and TOA Corporation, are competitive due to several reasons that contribute to their success in the industry:

1. Fulfilled domestic network

Even machines purchased from overseas can be repaired domestically thanks to their network such as branches. Manufacturers of recycling machinery and equipment establish partnerships with national and international organizations, including suppliers and distributors. These partnerships give you access to a wide range of resources, technical expertise, and spare parts needed to repair plastic recycling machines as shown in the below.

2. Quality Assurance and Certification

Japanese plastic recycling traders prioritize quality assurance and certification of their recycled materials. They use high quality control measures. This emphasis on quality assurance enhances their credibility and reputation in the market, making them a preferred choice for buyers who prioritize reliable and consistent recycled materials.³²

³² Plastic Recycling and Reuse Association (2022), Basic knowledge of plastic recycling

c. Customers

In the realm of plastic recycling, the responsibility of carrying out recycling processes lies in the hands of industry and municipality, and major players such as the Japan Containers and Packaging Recycling Association JCPRA (see also chapter 5a). Recycling plants are operated by a combination of these entities, working together to address the environmental concerns associated with plastic waste. These plants are equipped with specialized machinery and systems to efficiently sort, process, and transform plastic materials into reusable forms.

However, a direct contact to municipalities by European recycling companies would be unusual and difficult. Customers for European plastic recycling machinery and equipment are rather waste management companies such as DOWA ECO-SYSTEM Co., Ltd., Nippon Koei Co., Ltd, TAKUMA CO., LTD., recycling plant operating companies (see also chapter 6a) or recycling consortia.

d. Associations & Research Institutes

Collaboration is a key element of Japan's recycling industry. Companies actively collaborate with government agencies, research institutions, and other stakeholders to share knowledge, expertise, and best practices. These collaborative efforts promote continuous improvement, technological innovation, and the development of efficient recycling processes. The collective expertise of various stakeholders helps Japanese recycling companies stay at the forefront of industry advancements. The collaboration pattern is various. Some are cooperating with university and company, or government and association.³³ In fact, at material recycling, there are many cases where product manufacturers and chemical manufacturers collaborate with recyclers and universities that already have the technology to promote research and development.³⁴

Some relevant associations and institutions in Japan are:

- Council for PET Bottle Recycling, <http://www.petbottle-rec.gr.jp/english/>
- Japan Containers and Packaging Recycling Association (JCPRA), <http://www.jcpa.or.jp/tabid/603/index.php>
- Japan Environmental Facilities Manufacturers Association (JEFMA), http://www.jefma.or.jp/english-page_f.htm
- Japan Industrial Waste Information Center, <http://www.jwnet.or.jp/en/index.html>
- Japan Industrial Waste Management Foundation, <http://www.sanpainet.or.jp/>
- The Japan Society of Industrial Machinery Manufacturers (JSIM), <https://www.jsim.or.jp/en/e-jsim/>
- The Japan Society of Material Cycles and Waste Management (JSMCWM), <http://jsmcwm.or.jp/international/>
- Japan Waste Management Association, <http://www.jwma-tokyo.or.jp/asp/english/index.html>
- JPM Japan Plastics Machinery Association, <https://www.a-jpm.jp/>
- JPPF All Japan Plastic Products Industrial Federation, <http://www.jppf.gr.jp/>, (https://www.jpif.gr.jp/english/profile/m_list.html)
- Plastic Waste Management Institute (PWMI), <http://www.pwmi.or.jp/ei/index.htm>

³³ METI Journal 28.03.2022

³⁴ Sumitomo Mitsui Banking Corporation (2021), Recycling of waste plastics

Research institutes in the field of plastic recycling are for instance:

- ERI Eco Research Institute Ltd., <https://www.ecobioplastics.jp/en/about/>
- NRI Nomura Research Institute, Ltd., <https://www.nri.com/en/company>
- PWMI Plastic Waste Management Institute, <https://www.pwmi.or.jp/english/>
- Tohoku University, <https://www.eng.tohoku.ac.jp/english/>
- University of Kitakyushu, <http://www.env.kitakyu-u.ac.jp/ja/kenkyuka/hohya/research.html>
- Yano Research Institute Ltd., https://www.yanoresearch.com/about_yano/

7. Market Potentials and Recommendations

a. Potentials

There are some factors that highlight the potentials in the Japanese market for innovative plastic recycling technologies:

Promotion of a recycling-oriented society

Japan has the second highest plastic management index (PMI) in the world, thanks to its advanced waste management system and high levels of local cooperation. At the same time, the recycling market continues to grow due to the world's second largest amount of waste plastic waste and growing environmental awareness around the world. Government regulations such as the Resource Curation Strategy for Plastics in 2019 and the Plastic Resource Circulation Act in 2022 are becoming stricter every year, which means opportunities for market expansion and business growth for European companies. In fact, Japan has declared that it will encourage recycling over incineration of waste plastics and is implementing the European Green Deal policy and the New Circular Economy Action Plan.³⁵

The 4th Fundamental Plan for Establishing a Sound Material-Cycle Society³⁶, which was approved by the Cabinet on June 19, 2018, indicates measures to be implemented in a strategic manner. The target for the market size of business related to a Sound Material-Cycle Society is 40 trillion JPY in 2025. One issue mentioned this plan is the shortage of human resources for waste treatment and recycling. That there is a demand for a waste management system corresponding to the aging society, so a more automated waste collection and treatment system is needed.

Interest in European Knowledge

European companies have accumulated extensive experience and knowledge in plastic recycling due to their involvement in mature recycling markets. By sharing best practices, industry insights, and technical know-how, European companies can support Japanese companies in building robust plastic recycling systems. This knowledge transfer can accelerate the development of the plastic recycling sector in Japan.

³⁵ JETRO (2023), "European Commission research institute publishes report recommending recycling over incineration for waste plastic disposal"

³⁶ MoEJ (2018), 4th Fundamental Plan for Establishing a Sound Material-Cycle Society

In addition, since the capacity of plastic processing that was exported to the Asian region has not kept up, advanced technologies and mechanisms from Europe will be required.³⁷ The business and technological cooperation potential for plastic recycling in Japan is significant. Especially advanced sorting technologies for industrial and household wastes will have good chances for the Japanese market (e.g. identification and sorting technologies for the mechanical recycling of black plastics).

b. Challenges and main obstacles for market entry

The Japanese waste management and recycling market is considered difficult. Addressing challenges and leveraging the key success factors can increase the prospects for European plastic recycling companies to establish a strong presence and succeed in the Japanese market. Market entry challenges and main obstacles for European plastic recycling companies in Japan are as follows:

- The Japanese recycling market is relatively mature, with established local players. European companies may face the **competition** from Japanese companies that have already had well-established networks, references, customer relationships, and market knowledge. Building a competitive advantage and differentiating themselves from local competitors can be a significant challenge. As a rule, Japanese tend to favor national products and manufacturers. On top of that, Japanese are of course loyal to their existing business partners.
- Japan's recycling market can be **complex** for foreign companies to navigate independently. Partnering with local Japanese distributors, agents, or joint ventures can provide European companies with market entry support, access to local networks, and distribution channels. Collaborative ventures can help European companies establish a presence in the Japanese market and tap into the opportunities it offers.
- Although tendering for public projects is common, it is **difficult for a foreign company to win a contract**. Obstacles include the lack of transparency in the tendering process, specific conditions that are difficult for foreign companies to meet, vague evaluation criteria, difficult access to relevant information and the requirement for prior domestic project references. The best strategy for a European company is therefore to work with a Japanese company, familiarize itself with the tendering process and gather domestic references.
- High customer orientation and a good corporate image are prerequisites for successful business in Japan. The waste processing industry in Japan is turning to more selection and globalization. Rather than a pure technology provider of sorting machines, it therefore can be recommended to take the position as **secure solution provider** together with important customers. To do so it will be an urgent task to establish a trust relationship with customers introducing suitable machines for the customer's needs.
- Japanese customers are uncompromising when it comes to quality - even cosmetic faults and irrelevant to the function of the product. Japanese companies are quick to question the entire production and logistics process. An additional delivery check ex works or on arrival in Japan to ensure "Japanese quality" is recommendable. Also in the plastic recycling market in Japan, the **quality standards** are very high, and the requirements for the quality of recycled plastics are strict. When European companies enter the Japan market, it is important to have the technology and processes to provide high-quality recycled plastics.

³⁷ The Japan Research Institute (2020), Current situation and new business possibilities related to waste plastics in Japan

- In a country where "the customer is God", a high level of **service** and perfect quality are considered normal. In this view, a deal is not considered closed after delivery, as Japanese customers usually expect free service and after-sales support.
- Relationships are the basis of business in Japan. It is important to show the right level of respect and to always be polite and diplomatic. Patience is essential when dealing with business relationships, and adherence to local etiquette regarding gift buying is important. A **close customer-supplier relationship** needs to be established before the actual business can begin. Japanese are not risk-averse and prefer continuity and stability. Mutual trust is the key, but it takes time.
- Since decisions in Japanese companies are often the result of extensive consultations with many people from different departments throughout the organization, the **decision-making process is particularly lengthy**, and several meetings are needed to reach an agreement.
- A main obstacle and challenge to doing business in Japan still is **language**. A trained, experienced Japanese interpreter is recommended for discussions and negotiations with potential business partners or customers.

c. Recommendations

When European plastics recyclers enter the Japanese market, it is essential that they tailor their approach to the specific needs and requirements of the Japanese market. Here are some key areas to focus on:

- Advanced sorting and separation technologies
- Material and chemical recycling
- Focus on sustainability and circular economy
- Circular economy consulting and solutions
- Promoting a recycling society
- Knowledge sharing

To be successful in the Japanese market, European companies should pay close attention to the following factors:

- Time and human resources are required: Entering the Japanese market requires significant financial, time and human resource investments. A thoughtful long-term approach is necessary to achieve success and make a positive impact in this demanding market.
- Utilize supporting organizations such as embassies, chambers of commerce, JETRO, EBC and the EU Japan Centre for Industrial Cooperation to access valuable market information and market entry assistance.
- Customers are expecting high quality and an intensive after-sales-service, which should best be carried out by a specialized Japanese service company. Existing customers need to be visited regularly, not only for business purposes but also to be visible and to maintain the relationship. It is important to continue to be seen as demonstrating a serious willingness to operate in the Japanese market and to deepen the relationship with Japanese partners.
- High quality products and services: Ensure that both products and associated services, such as sales, after-sales support and maintenance, are of an exceptionally high standard, as the Japanese market demands top quality.

- **Select reliable partners:** Carefully select reliable partners to work with, as they can have a significant impact on the success of market entry.
- **Build strong customer relationships:** Focus on building and maintaining excellent customer relationships. Regular visits, including courtesy visits, are essential to build trust and visibility.
- **Build local networks:** Work on building local networks and personal relationships as these play a vital role in business development and success.
- **Attend important trade fairs:** Participating in prominent trade shows, such as the annual N EXPO in Tokyo, is essential for gaining exposure and networking in the waste industry.
- **Detail and image:** Japanese consumers value attention to detail, so invest in areas such as professional interpretation services to ensure clear communication and a positive image.
- **Highlight EU origin:** Capitalize on the excellent reputation of European environmental technologies and proudly display EU origin, especially for companies from Germany, the Netherlands and the Nordic countries.
- **Interpreters:** Never skimp on a highly qualified interpreter, as this person represents the company and needs to understand and convey more than just words.

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