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Comparative Analysis
Circular Economy and Green Public Procurement Policies
for preventing plastic pollution in Japan and the European Union

Final version

March 2021

Rethinking Plastics: Circular Economy Solutions to Marine Litter

Disclaimer

This study is financed by the European Union and the German Federal Ministry for Economic Cooperation and Development (BMZ).

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Recommended citation:

Nishiyama, T.; Kato, M.; Hotta, Y.; Lagarde, Z.; Aoki-Suzuki, C.; Fushimi, E. (2021) Comparative Analysis Circular Economy and Green Public Procurement Policies for preventing plastic pollution in Japan and the European Union. European Union (EU), German Federal Ministry for Economic Cooperation and Development (BMZ)

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Foreword

This report was produced by the Institute for Global Environmental Strategies (IGES) under the "Rethinking Plastics - Circular Economy Solutions to Marine Litter" programme commissioned by the European Union (EU) and the German Federal Ministry for Economic Cooperation and Development (BMZ), to compare the policies and practices of Japan and the EU on a circular economy (CE) for plastics and green public procurement (GPP).

While plastic is certainly one of the most useful materials that came out of the 20th century, it has also led to an increase in waste, with recent attention focused particularly on problems caused by marine plastic, which has become an urgent global environmental issue.

Various countries have long tried to solve the problem of increased amounts of waste through initiatives such as the circular economy in the EU and the 3Rs in Japan, and these efforts have been expanded to include plastic waste. Of course, what is really necessary is not only to make efficient use of resources and reduce waste, but also to work on multiple issues including reduction of greenhouse gases as a way to deal with climate change. The idea of considering various environmental and social issues in parallel and working together to solve them is embodied in the principles of the sustainable development goals (SDGs).

IGES is Japan's leading public research institute in the field of policy research on the environment, and as such, we have been conducting vigorous research activities in the areas of climate change, resource circulation, lifestyles and natural resources, in collaboration with governments and institutions in Japan and abroad. This report covers a broad range of information on the circular economy of plastics and green public procurement in Japanese policy and business. It also analyses and introduces the latest developments in the same field in the EU, and extracts points for future discussion from the comparative study. Japan and the EU have quite contrasting historical and cultural backgrounds, so it is inevitable that there are some differences in the way policies are approached. This report makes these differences clear from several specific perspectives. It is by analysing each other's policies that we can see where we can learn from each other and what goals we should share.

Japan and the EU have a long history of cooperation on the environment. In 2018, when I was working as Vice-Minister for Global Environment at the Japanese Ministry of the Environment, the EU-Japan High-Level Meeting on the Environment was held in Tokyo. It was there that I met Daniel Calleja Crespo, who was at that time the Director General of the DG for Environment of the European Commission, and we had a valuable discussion at the secretariat level on mutual cooperation for a circular economy. I believe that this report will contribute to the further development of cooperation between Japan and the EU, and to addressing environmental challenges in other regions as well.

Yasuo Takahashi, Executive Director, IGES

List of Abbreviations

3Rs	Reduce, Reuse, Recycle
10YFP	10-Year Framework of Programmes on Sustainable Consumption and Production Patterns
ADB	Asian Development Bank
AEHA	Association for Electric Home Appliances (Japan)
AEPW	Alliance to End Plastic Waste
APRSCP	Asia Pacific Roundtable for Sustainable Consumption
ASEAN (+3)	Association of South-East Asian Nations (+Japan, South Korea and China)
ASR	Automobile Shredder Residue
BAU	Business As Usual
BMU	German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety
CE	Circular Economy
CFC & HFC	Chlorofluorocarbon & Hydrofluorocarbon
CLOMA	Japan Clean Ocean Material Alliance
CPP	Circular Public Procurement
EC	European Commission
ECHA (RAC)	European Chemicals Agency (Committee for Risk Assessment)
EEA	European Economic Area
EF	Expertise France
EFSI	European Fund for Strategic Investments
ELV	End-of-Life Vehicle
EPR	Extended Producer Responsibility
ERIA	Economic Research Institute for ASEAN and East Asia
ESCO	Energy Service Company
EU	European Union
EuPC	European Plastic Converters
FRP	Fibre-Reinforced Plastic
FY	Fiscal Year (April to March in Japan)
G7	Group of Seven
G20	Group of Twenty
GDP	Gross Domestic Product
GHG	Greenhouse Gas

GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH
GPN	Green Purchasing Network
GPP	Green Public Procurement
GPPEL	(Asia Pacific) Green Public Procurement and Ecolabelling
ICLEI	International Council for Local Environmental Initiatives
IGES	Institute for Global Environmental Strategies
ISO	International Organization for Standardization
IT	Information Technology
JARC	Japan Automobile Recycling Promotion Center
JBIB	Japan Business Initiative for Biodiversity
JBPA	Japan BioPlastics Association
JEA	Japan Environment Association
JIS	Japanese Industrial Standards
JPIF	The Japan Plastics Industry Federation
JRC-IPTS	Joint Research Centre's Institute for Prospective Technological Studies
LCA	Life Cycle Assessment
MAC	Multi-stakeholder Advisory Committee
MAFF	Ministry of Agriculture, Forestry and Fisheries (Japan)
METI	Ministry of Economy, Trade and Industry (Japan)
MHLW	Ministry of Health, Labour and Welfare (Japan)
MLIT	Ministry of Land, Infrastructure, Transport, and Tourism (Japan)
MOEJ	Ministry of the Environment (Japan)
MONRE	Ministry of Natural Resources and Environment (Thailand)
MPL	Marine Plastic Litter
NAP	National Action Plan
NGO/NPO	Non - Governmental Organisation/ Non-Profit Organisation
OECD	Organisation for Economic Co-operation and Development
PC	Personal Computer
PE	Polyethylene
PEF & OEF	Product Environmental Footprint and Organisation Environmental Footprint
PET	Polyethylene Terephthalate
PLA	Polylactide
PP	Polypropylene
PPRC	Plastic Packaging Recycling Council (Japan)

PRE	Plastics Recyclers Europe
PTT	Poly-tri-methylene terephthalate
REACH	Registration, Evaluation, Authorization and Restriction of Chemicals
PVC-U	Poly Vinyl Chloride-Unplasticized
SCP	Sustainable Consumption and Production
SDGs	Sustainable Development Goals
SMC	Sound Material Cycle
SPP	Sustainable Public Procurement
SPPEL	Stimulating the Demand and Supply of Sustainable Products through Sustainable Public Procurement and Ecolabelling
SUP	Single-Use Plastic
UN	United Nations
UNEP	UN Environment Programme / United Nations Environment Programme
UN-ESCAP	United Nations Economic and Social Commission for Asia and the Pacific
WEEE	Waste Electrical and Electronic Equipment

Executive Summary

Tackling the plastic issue requires more than simple waste management policies. A comprehensive policy framework with a circular economy vision is needed as a fundamental solution. This report provides a comparative analysis of circular approaches to plastics in Japan and the European Union (EU), covering measures for plastic reduction, reuse, recycling and sustainable alternatives (part 1). It also compares their respective green public procurement (GPP) policies, looking at how these can be leveraged for realising a circular loop of plastics and reducing pollution (part 2). Areas for information sharing and mutual learning to inform future Japan-EU exchanges are suggested throughout the report.

A range of policy measures or initiatives have been implemented by Japan and the EU at local, national, and international level. In line with the recent global momentum on plastics, both economies have taken more integrated approaches to plastics, geared towards reduction, reuse, and recycling for closed-loop products and systems. These policies have been completed by voluntary actions led by private companies, business alliances, and research initiatives, among others.

The situations in Japan and the EU can be partly summarised as follows:

- Japan has a long history of waste management, "3Rs" ('Reduce, Reuse, Recycle') and "resource circulation"[1] policies. The Japanese framework for waste management and recycling encompasses numerous sector-specific and product-specific regulations. These tend to be split between production measures and waste management ones, i.e. without a fully integrated approach. However, the 2019 Plastics Strategy[2] sets a more holistic policy framework to tackle marine plastic pollution. Large retail chains and the recycling industry are also poised to play a greater role in improving the circular economy, as some of their recent efforts attest - although it is acknowledged that all actors of the value chain have their fair share to play. With regard to GPP, while the policy coverage and list of prescribed products are broad, successful implementation has been hindered by a lack of local capacity and resources, with the exception of certain front-runner municipalities.
- With the 2020 Circular Economy Action Plan (CEAP), among others, the EU has developed a set of integrated policies covering both production and waste management, as well as different plastic categories and sectors. The CEAP includes new measures for Extended Producer Responsibility (EPR) scheme[3] (see below) as well as mandatory uptake of secondary plastic materials. Like in Japan, a mature market is yet to develop for secondary plastics involving suppliers, manufacturers, designers, distributors and recyclers, alongside consumers and governments. Coordination is required to help overcome quality, price, behavioural, regulatory, logistical, and technological barriers to the emergence of such a market. On the GPP front, progress by member states in implementing national action plans is notable, although implementation capacity is also limited at times. As in Japan, mandatory approaches, including specific products, could also be considered.

[1] The term "plastic resource circulation" is a general concept which refers to the idea of utilising plastic resources more efficiently. It is a direct translation from official policy terminology used by the Japanese government. "Recycling" is one component of the plastic resource circulation concept.
[2] Resource Circulation Strategy for Plastics (2019)
[3] Directive (EU) 2019/904 of the European Parliament and of the Council of 5 June 2019 on the reduction of the impact of certain plastic products on the environment

Based on the comparative policy analysis led in this report, some central issues have emerged in relation to eco-design, separate collection, secondary plastics markets, open standards, and sustainable alternatives for plastics. On GPP, topics of mutual interest could include: mandatory vs. voluntary approaches, capacity building for local authorities, monitoring and evaluation, as well as inclusion of broader environmental goals. These issues are introduced below, and potential topics for discussions are summarised in Table 1 as food-for-thought for future EU-Japan exchanges.

Eco-design

The importance of eco-design is emphasised in the various EU Circular Economy policies. In Japan, although the term is not frequently mentioned in policy documents, there is evidence of existing eco-design practices applied in various businesses.

EPR schemes can help promote eco-design. EPR policies imply that a producer is responsible for the environmental impact of a product's life-cycle, not only during production but also at the utilisation and disposal stages. This concept is incorporated into various EU policies (e.g. 2020 CEAP) and Japanese ones (e.g. 3R policies). The concept of EPR "modulation" has also been proposed in the EU's 2020 CEAP, whereby producers are financially responsible for not only the collection of waste, but also the end-of-life management of products and packaging. This is expected to be an effective incentive for producers to improve the recyclability of packaging, and potentially also a topic of mutual interest to the EU and Japan.

Secondary raw material (recycled material) market

Secondary plastics markets are an issue of growing importance for achieving a circular economy for both the EU and Japan. The term refers to materials that are recycled from waste and used as raw materials to produce a new product.

The key issues of secondary raw plastic materials are quality (e.g. lower-grade, colouration, presence of additives, impurities, polymer cross-contamination, etc.) and economic disadvantage. As plastic is difficult to recover from post-consumer waste, and as it is hard to ensure high quality of the material after recycling, the cost of secondary plastics is often higher than that of virgin ones. Life-cycle carbon dioxide (CO_2) analyses are often lacking when comparing recycled to virgin plastics, which makes the former seem less appealing than the latter. Furthermore, even if a product has been made from recycled material, it might still be used only once.

The mandatory uptake of secondary plastic content, which is proposed in the 2020 CEAP, is expected to stimulate the plastic recycling market and also mitigate the economic disadvantage of secondary plastic. The EU and Japan could share and develop their respective experiences with such issues.

The recycling industry also has an important role to play. Recycling companies could set and require minimum quality standards for secondary materials, and ensure their supply to plastic and packaging producers. They could lead the way in developing new stringent quality standards that would force other industries to ensure greater recyclability of the plastics sent to recycling.

Separate collection of waste

The EU and Japan could also explore issues around the collection, sorting, and recycling of waste, related processes and standards.

Recycling materials from waste involves separating the waste into unique materials, which starts with separate collection of waste. As the cost of collection and treatment of such waste is covered by municipalities' budgets, which come from taxpayer money and other government sources, resources available for improvements to the separate collection of waste can be limited, and all the more so when cities also need to manage increasing volumes of waste.

An alternative route for ensuring the separate collection of waste are retail chains, by providing the necessary space and facilities at their stores. This would certainly invigorate a greater focus on the recyclability of products that they sell, and could be a strong incentive for them to choose more recycling-friendly products, especially in terms of packaging.

Advanced IT (information technology) solutions could also offer new tools to facilitate the reuse, return, repair, recycling or shared use of goods and services, and in doing so help avoid the unnecessary consumption of single-use items and thus alleviate the recycling system.

Biodegradable and bio-based plastics

The term "bio-plastics" encompasses two broad concepts[4]:

- Biodegradable plastics (also called "green plastics" in Japan) are materials that can be broken down by microorganisms to form water and CO_2 in aerobic conditions, or water and methane in anaerobic conditions. They can be produced from either biogenic or fossil carbon sources.
- Bio-based plastics (also called "biomass plastic" in Japan) are made from plant-based sources such as sugarcane, beet sugar, corn, potatoes, grains, or vegetable oils. These plastics are not necessarily biodegradable.

Japan appears to be more forthcoming than the EU in its bid to introduce bio-based and biodegradable plastics. It would therefore be useful to discuss the appropriate usage and expected effects of such plastics from political, technical, environmental, and business viewpoints, in the context of resource circularity goals.

Green Public Procurement (GPP)

GPP has been identified as a significant tool for creating a circular economy and a sustainable society, both in the EU and Japan. In Japan, detailed GPP criteria, backed by CO_2 reduction estimations, have been set for purchasing goods such as paper and plastics. In the EU, there is an extensive body of national GPP policies as well as the pan-EU GPP policy framework.

While both the EU and Japan are strengthening the circularity of their approaches, for example by adding the mandatory use of recycled plastics to their GPP criteria, further efforts are needed to achieve full circularity in procurement processes in the plastics sector.

One issue common to the EU and Japan is the gap in implementation between national and local governments, or among different municipalities. In the case of Japan, some small local governments are very advanced in the implementation of their GPP policies, even more than the national government at times, while others have made little progress, including municipalities that have publicly committed to ambitious environmental agendas.

[4] Modified from Plastics Europe, 2016. Reference: https://www.plasticseurope.org/application/files/4315/1310/4805/plastic-the-fact-2016.pdf

Better estimates of overall reductions in plastic consumption achieved through GPP would also be necessary to strengthen the case of GPP. While in Japan the reduction of plastic use achieved through some GPP practices has been partly estimated (e.g. estimated reductions in the amount of plastic used as a raw material for stationery is 15.4t)[5], it would also be necessary to estimate the overall volumes of such goods procured to get an accurate picture of policy impact.

Making GPP mandatory and setting clear targets could be an option for promoting circular procurement. However, as seen in Japan, procurers might focus only on complying with the law, without understanding the purpose of GPP, and may therefore continue to purchase unnecessary products without seeking to reduce consumption in the first place.

Based on these identified policy issues, the table 1 below lists potential issues and topics for further consideration for future EU-Japan exchanges.

Table 1: Potential topics for future EU-Japan dialogues on circular economy, marine plastic litter, and GPP

Issues	Potential topics for consideration
Eco-design	The EU and Japan could exchange information on: ➢ Eco-design, its application, promotion, and effectiveness in order to reduce waste and improve reusability and recyclability. ➢ Current and upcoming eco-design and other policies: EPR modulation and mandatory content of secondary plastic in the EU; business practices for recycling for home appliances and PET bottles in Japan. ➢ Future policy developments, new business initiatives, emerging research topics covering eco-design and waste reduction/reuse/recycling. ➢ Open standards for eco-design and recycling-friendly materials and related issues: labelling; restrictions on additives and complex materials; reusability, reparability, decomposition, and recycling of products.
Secondary plastic market	➢ Analyses of the current market structures and status: stakeholders, market mechanisms, material flows, pricing of secondary plastic materials, etc. ➢ Common barriers and potential solutions to the emergence of mature, well-functioning markets for secondary plastic markets in Japan and the EU. ➢ Policy tools and business initiatives for stimulating the market. ➢ Quality issues of secondary plastic materials, and implications for domestic and international trade.
Separate collection	➢ Current municipal solid waste collection methods and potential efficiency gains through improved methods for increased circularity. ➢ Alternative ways to collect recyclables, including large retail chains, advanced IT systems, new reuse/returnable/repairable/sharing services, and efficient recycling methods.

[5] Such estimations cover a limited amount of products. Reference: https://www.env.go.jp/policy/hozen/green/g-law/jisseki/reduce-effect_h27.pdf

Biodegradable & bio-based plastics	➢ Definitions, appropriate applications and use, environmental safeguards. ➢ Risks in terms of consumer behaviour and for circularity (i.e. does not encourage waste reduction, simply its substitution). ➢ Issues with conditions for biodegradation, and tools to facilitate the adequate sorting, collection and treatment of biodegradable products. ➢ Expected overall impact in terms of waste reduction and overall life-cycle CO_2.
GPP	➢ Strengthening of linkages between GPP and other environmental goals (SDGs, climate, biodiversity). ➢ Recurring challenges to greater GPP: implementation gaps, lack of local resources, lack of capacity, etc. ➢ Potential solutions: mandatory GPP application; resources dedicated to training and capacity building; tracking tools; etc. ➢ Pros and cons of mandatory GPP implementation and of numerical targets. ➢ Incorporation of eco-labels into GPP policies: why, when and how. ➢ Measuring the effect of GPP on volumes of plastic consumption reduction. ➢ Stimulating the purchase of reusable products/packaging and secondary plastic content through GPP (e.g. office materials, outside furniture, equipment for playgrounds, reusable cups/food boxes in offices and canteens, etc.)

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Chapter 1: Introduction

1. Background: Plastic issues and Green Public Procurement (GPP)

Plastic as a global environmental issue

Plastic is one of the most useful materials for making our lives more convenient. Since the latter half of the 20th century, the production and use of plastic have increased rapidly due to its unique features, such as being cheap, easy to process, lightweight, and sanitary. Such dependency on plastic has resulted in a high density of plastic products in society and the marketplace. This is causing serious waste management issues that must be tackled through coordinated international actions. According to an OECD study (2018),[6] around 14%-18% of waste plastic is recycled globally, while another 24% is thermally treated through incineration and other methods. Such figures highlight the importance of finding global solutions to today's linear consumption patterns, which are compounded by a host of negative consequences caused by plastic, including:

- pervasive littering in cities, riversides, and coastal sites, made up of single-use plastics (containers, packages, straws, cutlery, etc.) which are cheap and easily disposable;
- extra burdens on waste management systems, in part because of the large volumes plastic occupies in landfill sites due to its low density;
- accrued air pollution including dioxin emissions when burned under inappropriate conditions;
- increased fossil fuel consumption and CO_2 emissions which contribute to climate change.

Another critical aspect surrounding plastic policy is how to deal with marine plastic litter (MPL), which has recently been recognised as one of the most pressing global environmental problems. Such political momentum has been driven by alarming reports on the growing amount of plastics flowing into the ocean. According to these studies, 80% of marine debris would originate from land-based sources (Jambeck et. al., 2015), which underscores the importance of waste hierarchy.

In this context, the international community has committed to various declarations and initiatives on the topic. These include the "G20 Action Plan on Marine Litter" (launched at the G20 Hamburg summit, June 2017), the "G7 Ocean Plastics Charter" (launched at the G7 Charlevoix Summit, June 2018), and the "G20 Implementation Framework for Actions on Marine Plastic Litter" (established in the G20 Ministerial Meeting on Energy Transitions and Global Environment for Sustainable Growth, June 2019). As well as the "Osaka Blue Ocean Vision", agreed upon by all G20 members at the June 2019 Osaka Summit, which also aims to reduce additional pollution by marine plastic litter to zero by 2050. This target is now supported by more than 80 countries and regions including the non-G20/outreach countries[7], including Japan and the EU.

As these various international initiatives are fairly recent, their activities and achievements have not yet been fully examined nor coordinated. The absence of such overall coordination has led to some overlaps in efforts led in the ASEAN region. In this sense, this report could be useful for

[6] Reference No.25

[7] The full list of countries and regions supporting the Osaka Blue Ocean Vision is under development – related information can be found in the G20MPL portal site: https://g20mpl.org/ (Number of signatories as of September 2020).

providing insights and information on the situation, as well as analysis on emerging developments and further actions to be taken.

Green public procurement (GPP) as a powerful tool to tackle the plastics issue

To achieve higher recycling rates of plastic waste and to realise the transition to a more sustainable economy, Green Public Procurement (GPP) could be a significant policy tool.

It is now widely recognised that the development and implementation of more circular production models should be encouraged, including the development of alternatives to minimise the use of conventional plastics for unnecessary applications (UNEP, 2018). However, there are still challenges to be tackled, including low levels of interest among consumers and public buyers in their decisions to purchase recycled plastic products or products with less negative environmental impacts (OECD, 2018).

GPP has a strong potential to deliver major impacts not only on the public sector market, but also on the wider market for sustainable and circular products and services. It can act as a catalyst for introducing new economic measures and consumer incentives.

In its 2020 Circular Economy Action Plan (CEAP), the European Commission proposed GPP as an instrumental policy tool to increase consumer demand for sustainable products. As public procurement still accounts for a large proportion of GDP both in the EU (14%)[8] and Japan (20%)[9], it would be useful to discuss how to further increase the uptake of GPP for achieving a sustainable society and a circular future for plastics. This issue is discussed more at length in Part II.

2. The “Rethinking Plastics: Circular Economy Solutions to Marine Litter” project

The “Rethinking Plastics – circular economy solutions to marine litter” project is a programme funded by the European Union and the German Federal Ministry for Economic Cooperation and Development (BMZ). The Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH and Expertise France (EF) are in charge of overall programme implementation from May 2019 to April 2022. The programme aims to i) support a transition towards sustainable consumption and production of plastic in East and Southeast Asia to contribute to a significant reduction in marine litter; and ii) strengthen EU cooperation with countries in the region in the areas of circular economy, plastic waste, and marine litter reduction as outlined by the EU Plastics Strategy (presented in chapter 3). This wide-ranging and unique programme targets seven countries in the Asia-Pacific region: Singapore, Indonesia, Vietnam, China, the Philippines, Thailand and Japan.

In addition to this project, regular discussions are taking place in other forums, for example through the EU-ASEAN E-READI programme, the EU-Japan High-Level Policy Dialogue, the G20/G20 Resource Efficiency Dialogue, as well as the EU Circular Economy Missions. These existing collaborations could serve as useful platforms for enhanced engagement on CE issues between Japan and the EU, as well as in the emerging ASEAN countries seeking to introduce new circular economy policies.

This report was thus proposed and prepared with the aim of supporting the EU-Japan dialogue on circular economy, MPL, and GPP facilitated by the *Rethinking Plastics* project. Expertise France has commissioned the Institute for Global Environmental Strategies (IGES) to conduct a comparative policy analysis and to identify topics and opportunities for furthering EU-Japan

[8] Reference: https://ec.europa.eu/growth/single-market/public-procurement_en
[9] Reference: Calculated based on the statistical data from Cabinet Office. https://www.esri.cao.go.jp/index-e.html

collaboration on the above policies. This report is therefore expected to provide a knowledge base for advancing bilateral cooperation, as well as regional and international partnerships in the wider context of a more sustainable and circular future for plastics for all in the long run.

3. Research methods and report structure

This report is based on desktop research and interviews with key stakeholders from governments, public-private organisations, and expert review processes. As a complement to the existing literature review, it includes updated information from interviews which are not yet publicly available. For privacy reasons, the personal views of the interviewees working on these issues, and information related to the future directions of their organisations, are not explicitly included, but rather outlined in essence.

This report is structured in two parts: plastic pollution and circular economy policy analysis on the one hand, and the potential of GPP on the other.

In the first part, chapters 2 and 3 present the historical background and main stakeholders of plastic waste and circular economy policies in Japan and the EU, respectively. Chapter 4 describes some of the features of existing policy approaches to plastic waste, the differences between the two contexts, as well as the key policy challenges and opportunities for both the EU and Japan with regard to plastic pollution and the circular economy.

In the second half of the report, the potential of GPP as a policy tool to tackle the plastic issue is discussed. Following an overview of GPP policies in the EU and Japan in chapters 5 and 6 respectively, chapter 7 analyses how these policies could contribute to realising a circular economy and tackling plastic issues.

Finally, chapter 8 summarises the overall findings emerging from this comparative analysis and provides a set of recommendations for both the EU and Japan.

PART I: CIRCULAR ECONOMY AND THE PLASTICS ISSUE

Chapter 2: Circular economy and the plastics issue in Japan

Before delving into the details of the Japanese then EU policies, it is important to get a first overall picture of how both economies have seen their waste generation and recycling rates evolve over time. Thus, as a scene-setter, the evolution of these in both the EU and Japan are compared in the Figure 1 below.[10]

The figure shows that while the amount of waste generated per capita in Japan has decreased significantly, the recycling rate has not improved much over the past 20 years. In contrast, in EU countries, the amount of municipal waste generated per capita has not dropped since 2000, whereas the recycling rate has significantly increased. For the purpose of comparison, Figure 1 also shows the calculated results of non-recycled waste per capita, indicating almost the same results for the EU and Japan.

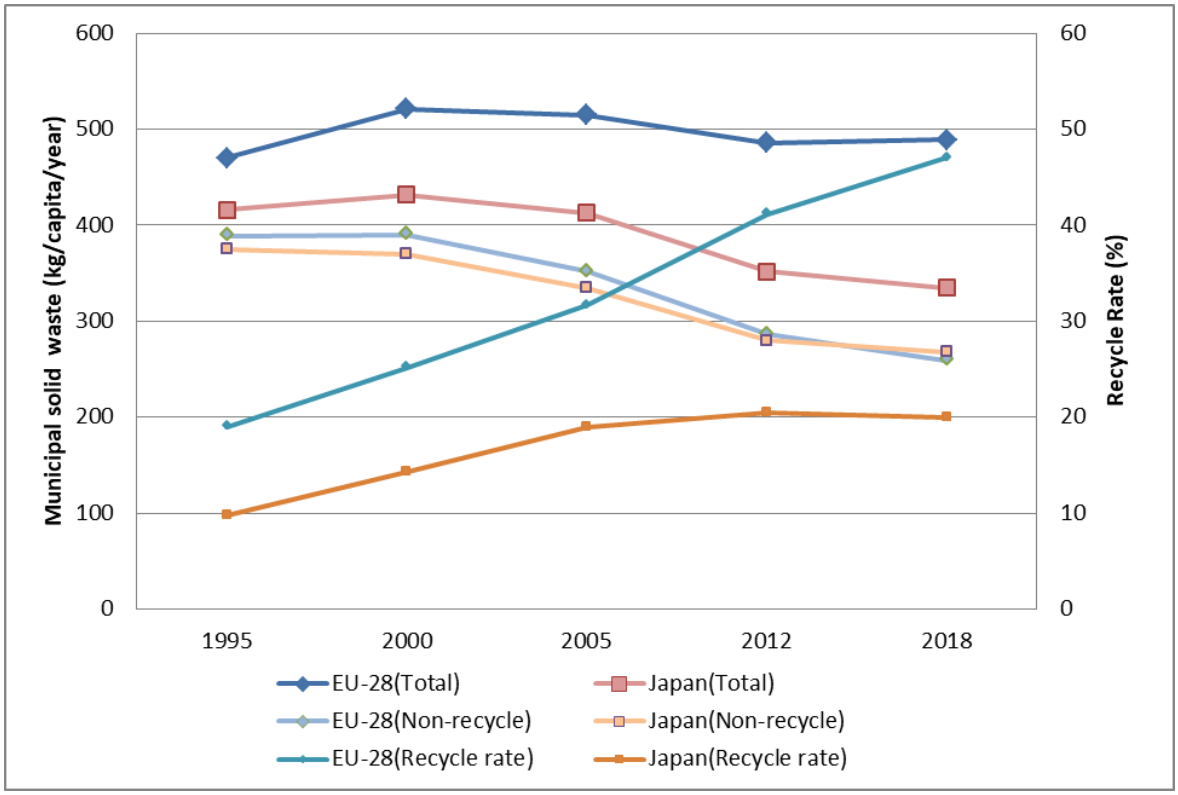

Figure 1: Municipal waste generation and recycling rate in EU and Japan

(Source: EU documents[11] - The recycling rate is calculated from the "Municipal waste treatment" table given that "material recycling" and "composting" are recycled. The result calculated is almost consistent with the numbers shown in the next figure. Source for Japan: see Figure 2)

[10] It should be noted that the data of Japan only shows the amount of waste collected by municipalities. It does not include home appliances (manufacturers are responsible for their collection), nor certain recyclable materials (collection may be carried out by the private sector such as retail shops).

[11] Reference: https://ec.europa.eu/eurostat/statistics-explained/index.php/Municipal_waste_statistics#Municipal_waste_generation

A more detailed study would be required to show comparable data for Japan because the definitions of “packaging waste” and “waste electrical and electronic equipment” differ between the EU and Japan.

This begs the question of the reasons behind such differences between the EU and Japan[12]. While there are a multitude of factors explaining these, the following section will focus on the evolution of Japanese policies related to the circular economy, before taking a closer look to the European ones in chapter 4.

First, an overview of plastic resource circulation in Japan will be presented, including the historical background (starting before the 1990s, post-1990s and more recently since 2019), regulations, key actions undertaken by the government and/or business, as well as a stakeholder analysis.

The most basic concept of resource circulation in Japan is the 3Rs (Reuse, Reduce, Recycle), which is defined in the *Basic Act for Establishing a Sound Material-Cycle Society* (2000). The Act defines the vision of a Sound Material-Cycle Society (SMCS) that reduces natural resource consumption and minimises environmental impact by: 1) reducing waste generation; 2) utilising resources in a circular manner; and 3) disposing of waste in an appropriate manner.

Box 1: Terminology

Box 1: Terminology

There are several Japanese terms which are comparable to the EU’s term of ”Circular Economy”. While these terminologies are similar, there are some Japan-specific terms, as following:

- ”Sound material-cycle society”. This is an overarching policy concept, which encompasses the concepts of resource circulation and 3Rs. It has a three-pronged objective: ensure a material-cycle society, control consumption of natural resources and reduce the environmental burden. This term is mainly used for policy documents.
- ”Resource circulation” is a general term including both production and waste management sides. The term is often used by Japanese government including MOEJ and METI, production industries, as well as municipal and private waste management sectors.
- ”3Rs (reduce, reuse, recycle)” is a more specific term for waste management policy and practice. The term was defined in the Basic Act for Establishing a Sound Material-Cycle Society (2000). It indicates the priority of reduce, reuse and recycle in this order. Thermal recovery and appropriate disposal follow the order of priority. Now 3Rs (usually written as “3R” in Japan) is a popular word in the field of waste management and well-known to the Japanese citizens.

1. Historical background of waste management and the “Sound Material-Cycle Society” in Japan

In the 1960s and 1970s, the combination of strong economic growth and the lack of landfill sites forced Japan to tackle sharp increases in waste. It did so through the development of a sound material-cycle policy framework, which forms the basis of the circular economy in the country,

[12] Reference: https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52001DC0031&from=EN

and which promotes the concept of 3Rs (see MOEJ (2014)[13] for a detailed history of Japan's waste management and SMCS development). Figure 2 and Figure 3 show the historical trend of waste generation and recycling rates in Japan, respectively.

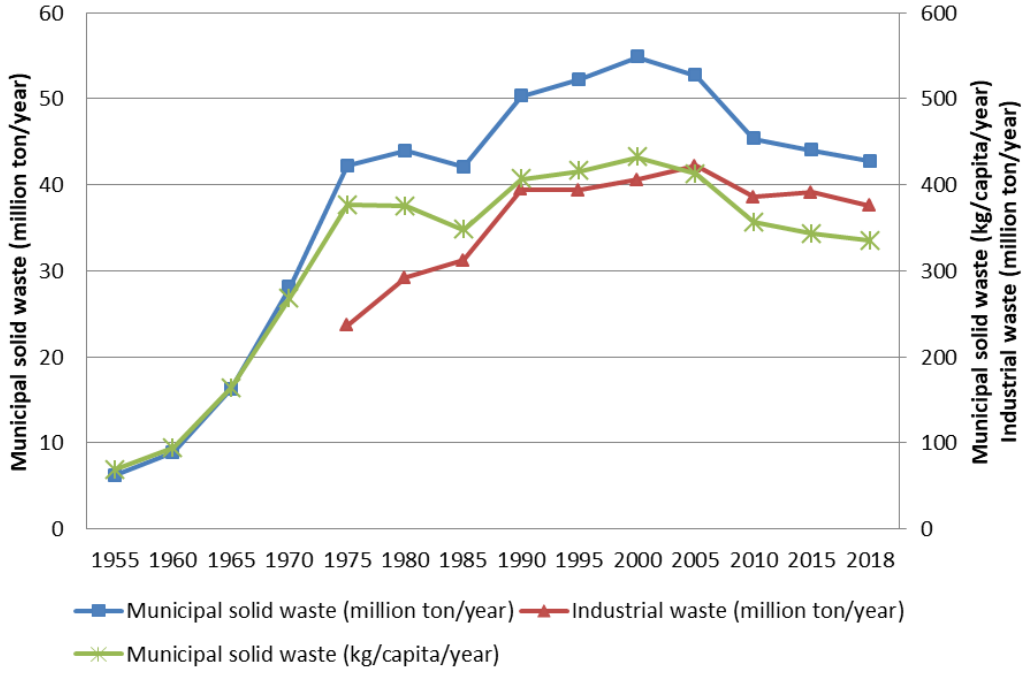

Figure 2: Waste generation in Japan (municipal waste and industrial waste)

The above Figure 2 illustrates the aforementioned steep increase in per capita and total municipal solid waste in Japan from 1960s, as well as industrial waste from 1970s. While a small reduction has been noted since start of years 2000s, the overall volumes of municipal and industrial waste remain nevertheless high, at about 42 million tons/year and 330 million tons/year[14]. This issue is compounded by the fact that the recycling rates in Japan have stabilised since approximately 2006 and that no further net improvements have been noted to date, as shown in the Figure 3 below.

[13] https://www.env.go.jp/en/recycle/smcs/attach/hcswm.pdf

[14] Source: Authors based on MOEJ (2014), Environment statistics by MOEJ and population statistics of Japan: https://www.stat.go.jp/data/kokusei/2005/nihon/pdf/01-01.pdf

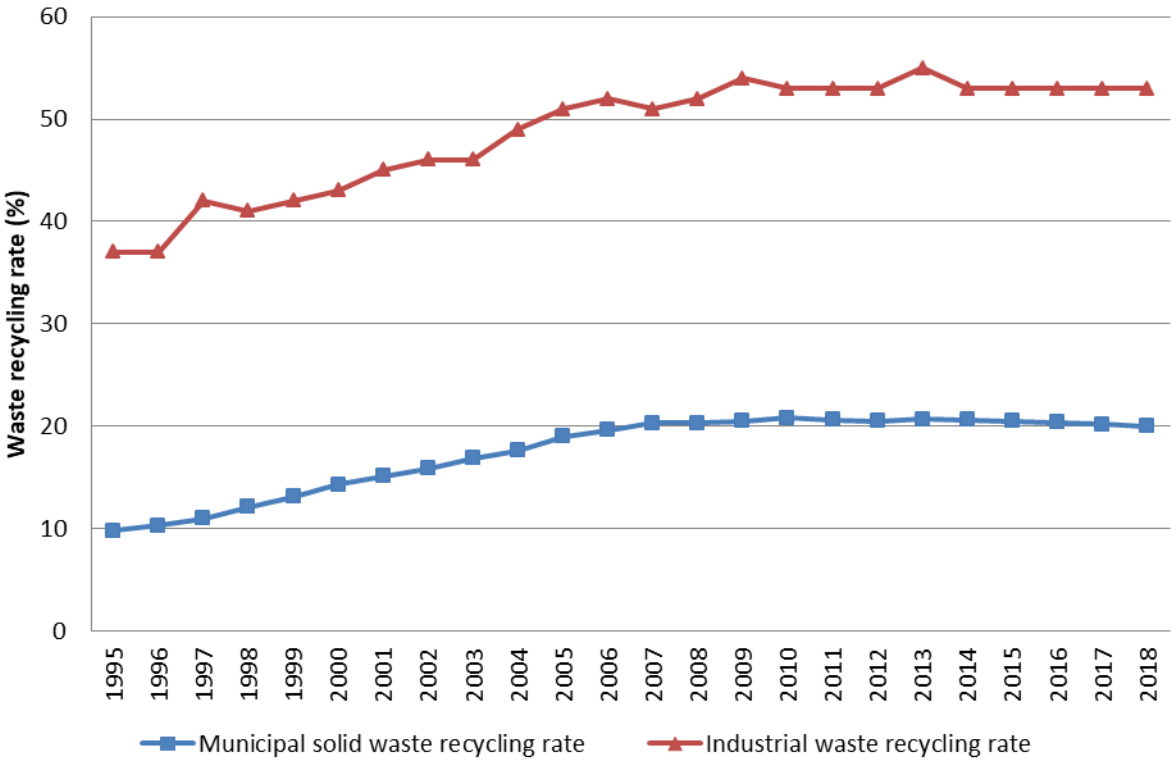

Figure 3: Waste recycling rate in Japan[15]

These historical trends are further discussed in the sections below.

Before the 1990s: Rapid increase in plastic waste and treatment

In the period of rapid economic growth in the 1960s and 1970s, the considerable increase in waste (see Figure 2) was due to changes in consumption behaviour, as well as a shift in the economy towards mass production and mass consumption. During that period, the use of home appliances rose and the number of supermarkets and convenience stores grew sharply, resulting in a rapid increase in the disposal of plastics.

In response to this, the Japanese government started to encourage municipalities to install waste incinerators via a national subsidy system in the 1970s. Separating household waste for improved collection was also first implemented at that time, with wide uptake by citizens. However, it was still difficult to keep up with the increasing waste volume: in many municipalities, plastic was still directly landfilled instead of incinerated. The shortage of landfill sites then also became an emerging issue.

In 1983, however, it was reported that waste incineration could generate dioxins[16], with plastic (especially polyvinyl chloride) as one of the major sources of pollution. To prevent dioxins, the focus was placed in the 1990s on replacing old incinerators. Since then, new types of incinerators equipped with thermal recovery systems have become more popular and common (mainly used

[15] Source: Authors based on MOEJ reference documents: https://www.env.go.jp/press/y0310-01/mat03_1_P2.pdf and Annual Reports of MOEJ, https://www.env.go.jp/en/wpaper/2019/index.html

[16] These are a group of highly toxic, chemically-related compounds that are persistent environmental pollutants, and can cause reproductive and developmental problems, damage the immune system, interfere with hormones and also cause cancer. https://www.who.int/news-room/fact-sheets/detail/dioxins-and-their-effects-on-human-health

for electricity generation). For example, the Tokyo Metropolitan Government (TMG) started separate waste collection in 1973, but plastic was separated as a “non-burnable waste” and disposed of directly into landfills. In 1997, the TMG acquired additional and sufficient capacity for the incineration of municipal waste, including plastic and the treatment of plastic gradually shifted from landfill to incineration by 2008. In 2008, the TMG finally decide to stop disposing of plastics in landfills.

After the 1990s: 3R promotion through policy and regulations

In the 1990s, waste generation reduction, along with separate collection and recycling, became key policy objectives for the government of Japan, as attested by the 1991 revision of the *Waste Management Act*. The Act requires that each local government should take necessary action for waste generation reduction and promotion of recycling. Separate collection of household waste which started in late 1970s in some municipalities was more widely adopted in 1980s and 1990s, through the implementation of the revision of the Act. (Separate collection by households has now become a common practice in Japan.)

Also in 1991, the government adopted *the Effective Resource Utilization Promotion Act*, which establishes basic rules for waste management. These include environmental considerations at product design and manufacturing stages, as well as the development of systems for independent waste collection and recycling by business operators.

In 1995, the principles of Extended Producer Responsibility (EPR) made their first appearance in Japanese legislation, through the *Act for the Promotion of Sorted Collection and Recycling Containers and Packaging*. Since then, in addition to this Act, various recycling Acts for different products have been enacted (see Section 3 for details). As a result, EPR principles now govern a much wider scope of products, as shown in the below list of recycling Acts per product category. (The recycling acts of food and construction material are not based on EPR principles.)

- Containers and packaging (1995)
- home appliances (1998),
- food (2000)
- construction material (2000),
- PCs and small rechargeable batteries under the *Effective Resource Utilization Promotion Act* (2001),
- end-of-life vehicles (2002), and
- small home appliances (2012).

In 2000, the *Basic Act for Establishing a Sound Material-Cycle Society* (called the *Basic Recycling Act*) was introduced to promote the 3Rs. Resource recycling and waste management were defined according to the following specific order: 1) reduction; 2) reuse; 3) recycling; 4) thermal recovery; and 5) proper disposal. In accordance with the Basic Act, the *Fundamental Plan for Establishing a Sound Material-Cycle Society* which lays out the practical arrangements for the Act was then released in 2003. It has since been revised periodically, as follows:

- 1st revision in 2003, including: publication of the “Overall Framework for Sound Material Cycle Society Policy”; emphasis on 3Rs; introduction of three numerical targets based

on material flow indicators that include resource productivity (entrance), recycling rate (circulation) and final disposal amount (exit).

- 2nd revision in 2008, including: publication of the "International Aspect of Sound Material Cycle Society" covering trans-boundary movement of recyclables and their sound management. Plus emphasis on "low-carbon society" goals.
- 3rd revision in 2013 including: greater emphasis on two of the 3Rs (Reduce and Reuse), and emphasis on the importance of quality of recycling.
- 4th revision in 2018[17] including: the release of "Material life cycle-based strategies" (not end-of life-products), of the "Regional Circular and Ecological Sphere", of the "Society 4.0", and emphasis on sustainable consumption and production (SCP) notions.

The latest 2018 revision includes an objective to achieve "Integrated Improvements on Environment, Economy and Society" through the following pillars: Regional Circular and Ecological Sphere (e.g. encourage city planning turned towards resilience and efficiencies) Proper Waste Management and Environmental Restoration (e.g. ensure stable and efficient waste treatment systems that provide added-value to the community), International Resource Circulation (e.g. advance Japanese environmental technologies, institutions, and systems globally), Disaster Waste Management Systems (e.g. strengthen country's capacity to ensure effective treatment of waste and resilience post disastrous events), Resource Circulation throughout the Entire Lifecycle (e.g. strengthen use of recycled materials, reducing construction waste, promoting a Plastics Strategy), as well as Sustaining Fundamentals for 3Rs and Waste Management (e.g. promote expanded use of advanced sorting technology). It also includes a range of targets and indicators.

Such regulatory developments did not happen in a vacuum, but in a changing environment whereby consumers turned towards products that were more convenient but less circular, as illustrated by the example of beverage bottles, presented below.

[17] The 4th Fundamental Plan for Establishing a Sound Material-Cycle Society https://www.env.go.jp/recycle/recycle/circul/keikaku/pam4_E.pdf

Box 2: History of beverage bottles in Japan, an example of changing production and consumption patterns

Reusable and recyclable bottles used to be more commonly found for beverages in Japan in the past. Yet, circularity has been lost in exchange of convenience. Indeed, before the rapid economic growth in the 1960s, most beverages were sold to consumers in glass bottles. Returnable systems used to be widely implemented in the past in Japan, and a deposit system for glass bottles still continues now for some kinds of beverage such as beer and soft drinks, though the share of glass bottles has become very low in Japan[1)]. Beverage packaging and bottles have been taken over by plastic and other materials. The largest reason seems to reduce weight of bottles. In addition, PET bottle is more convenient for consumers to be able to close cap for carrying than aluminum cans.

Item	Evolution over time
Beer	Share of cans (mainly aluminum) increased in 1980s, exceeding glass in 1995, and now occupies more than 70%[2)] of sales. Glass bottles are now mostly served in restaurants with a share of less than 10%[3)]. Annual consumption of beer in Japan (2018) was 5.1 million kL[4)].
Soft drinks	Share of aluminum cans increased in 1970s, making up about 50% of products sold in late 1980s[5)], but decreased to 12.4% (FY2018)[6)]. PET bottles started to be sold in large sizes (mainly 1.5 and 2 L) in 1984 and small sizes (mainly 500 mL) in 1996[7)], and now have a share of 74.6% of products sold (FY2018)[6)]. Annual production of soft drinks in Japan (2019) was 22.6 million kL[8)]. Annual production of PET resin for soft drink bottle purpose in Japan (2018) was 653 thousand tons[9)], which was approximately 15% of total plastic consumption for packaging and containers[10)].
Milk	Paper cartons increased since 1960s and now have a share of about 90%[11)]. Annual production of milk for drink in Japan (2019) was 3.6 million kL[12)].

1) Kirin has implemented a deposit system for glass beer bottles since 1974. https://www.kirin.co.jp/csv/eco/special/recycle/glass03.html
2) https://www.kirin.co.jp/entertainment/museum/history/theme/b14_12g.html
3) https://www.ssnp.co.jp/news/liquor/2018/01/2018-0124-1031-14.html
4) https://www.kirinholdings.co.jp/news/2019/1224_01.html
5) http://www.j-sda.or.jp/images_j/pdf/sokuseki.pdf
6) http://j-sda.or.jp/statistically-information/stati05.php
7) http://j-sda.or.jp/images_j/ebook/sengo_html/sengo.pdf
8) http://www.j-sda.or.jp/sp/qa_view.php?id=137&cat=12
9) http://www.petbottle-rec.gr.jp/data/materia_flow.html
10) http://www.pwmi.or.jp/pdf/panf2.pdf
11) https://www.nyukyou.jp/dairy/index.php?rm=4&qa_id=485
12) https://www.e-stat.go.jp/dbview?sid=0001724691

Section 1 – key insights

- Japan has a well-established policy framework for waste management and effective resource uses based on 3Rs practices, waste management, and resource circulation principles introduced in the 1960s.
- Japan has focused its efforts on reducing municipal solid waste by promoting 3Rs. It has also sought to encourage Japanese citizens to facilitate the separate collection of household waste, through greater sorting and other behaviours.
- Municipal and industrial waste recycling rates initially improved with the enforcement of individual recycling Acts. However, these rates have not progressed over the last decade. See Figure 4.
- Japanese 3Rs principles are a waste management policy only, and keep consumption and production separate.

2. Emergence of marine plastic litter and plastics policies in Japan

The country's recent waste management policy has been characterised, in part, by its efforts to curb MPL.

In Japan, social awareness of MPL grew rapidly in 2018, when Japan refused to sign the "Marine Plastics Charter" at the Charlevoix G7 Summit. This rising social awareness prompted the government to respond during its G20 Presidency in 2019 by playing a leading role in two important international agreements: the G20 Implementation Framework for Actions on Marine Plastic Litter (established in the G20 Ministerial Meeting on Energy Transitions and Global Environment for Sustainable Growth, June 2019) and the Osaka Blue Ocean Vision (shared and agreed in the G20 Osaka Summit, June 2019).

Recently, Japan has also taken on a leading role in Asia-Pacific regional cooperation on MPL. Through planned initiatives such as the ASEAN+3 Marine Plastics Debris Cooperative Action Initiative,[18] Japan promotes bilateral/multilateral cooperation, including capacity development partnerships, and conducts monitoring operations along with other Asian countries, particularly ASEAN Member States.

As mentioned in above, responding to increasing global attention to, and the urgency of the MPL issue, the Japanese government has developed a series of policies covering MPL and plastic resource circulation, in particular in the lead-up to its 2019 G20 Presidency. These include: the *Resource Circulation Strategy for Plastics* (2019), the *National Action Plan for Marine Plastic Litter* (2019), the *Amendment of the Marine Litter Act* (2018), as well as the *Roadmap for Popularizing the Development and Introduction of Marine Biodegradable and Bio-based Plastics* (2019 - ongoing), presented hereafter.

Resource Circulation Strategy for Plastics (2019)

As a more holistic approach to plastics, including marine litter, the recently formulated Resource Circulation Strategy for Plastics (referred to hereafter as the Japanese '2019 Plastics Strategy') can be considered as a key policy measure for Japan. It was released in May 2019, just before

[18] ASEAN+3 Marine Plastics Debris Cooperative Action Initiative, https://www.mofa.go.jp/files/000419527.pdf

the Osaka G20 Summit and is the first strategy to be genuinely integrated, since it brings together fragmented plastic policy measures. The aim is to lead the country towards a holistic and well-coordinated approach to both plastics and marine litter issues.[19] Key points of the Strategy are as follows. (See the Appendix I for further details).

- Reduce usage of single-use plastic for package and products, which could be avoided.
- Effective recycling system through separation, collection and cyclical use (including thermal recovery).
- Promotion of alternatives such as recycled materials and recyclable resources (e.g. paper, biomass plastics).
- Prevent plastics to flow into the ocean.

Among various measures, this strategy includes the target of introducing 2 million tons of biomass plastics by 2030, as determined by the Japanese government in the Global Warming Countermeasure Plan (2016).[20]

National Action Plan for Marine Plastic Litter (2019)

As a legal framework covering MPL specifically, Japan formulated a *National Action Plan for Marine Plastic Litter* in May 2019. This plan aims to prevent the outflow of plastic litter into the ocean and includes the following measures:[21] 1) Promotion of a proper waste management system, 2) Prevention of littering, illegal dumping and unintentional leakage of waste into the oceans, 3) Collection of scattered waste on land, 4) Recovery of plastic litter from the oceans, 5) Innovation in the development of alternative materials and conversion to these, 6) Collaboration with stakeholders, 7) International cooperation to promote measures in developing countries, and 8) Survey on actual situations and accumulation of scientific knowledge.

Amendment of the Marine Litter Act (2018) and related actions

For the prevention of marine littering and the promotion of waste management, Japan has boosted its efforts with the installation of additional facilities to increase the recycling capability and improve recycling of polystyrene foam boxes used in fisheries. It has also encouraged the acceptance of ship-generated waste at ports. Specific efforts on fishing gear have been made too, such as promoting onshore collection and appropriate treatment of used fishing gear and the prevention of unintentional leakage of plastics through appropriate use and proper management of fishing gear by fishermen. Additionally, through the *Act on Promoting the Treatment of Marine Debris Affecting the Conservation of Good Coastal Landscapes and Environments to Protect Natural Beauty and Variety* (the *Marine Litter Act*), cooperative actions have been implemented with national and local governments and fishing communities to tackle pollution generated by their activities.

Amendment of the Act on Treating Articles that Drift Ashore (2018)

The purpose of this Act is to ensure environmental protection of the seashore and promote cleaning-up activities. In the amendment of the Act in 2018, though reduction of microplastics was added as a policy objective, obligations for producers in ensuring clean seashores have not been determined yet.

[19] G20 Marine Plastics Litter Portal Site – Japan country page, https://g20mpl.org/partners/japan
[20] Reference: https://www.env.go.jp/earth/ondanka/keikaku/onntaikeikaku-zentaiban.pdf (in Japanese)
[21] Ibid.

Roadmap for Popularizing the Development and Introduction of Marine Biodegradable and Bio-based Plastics (2019 - ongoing)

To boost technology innovation, public-private collaborative efforts are encouraged in the Roadmap for Popularizing the Development and Introduction of Marine Biodegradable Bio-based Plastics.[22] This includes the development of alternative materials (e.g. biodegradable plastic and paper) for different products, including fishing gear. Several platforms such as the Clean Ocean Material Alliance (CLOMA) and the Plastics Smart campaign have also been created through government initiatives to encourage public-private partnerships and innovation development (further details can be found in the following pages).

Section 2 – key insights

- Social pressure against marine plastics pollutions has grown rapidly in the last years, supported by international momentum including in the G7 and G20 contexts.
- This has resulted in coordinated national action and legislation, going beyond individual sectors or institutional boundaries.

3. Regulations on plastic resource circulation and SMCS

In Japan, plastic resource circulation regulations, which relate to the recycling of plastics, individually govern different product categories. This means that there is not one single and overall set of regulations for plastic resource circulation as yet. In fact, resource circulation has always been considered as an extended concept of waste management in Japan's environmental policy history. Hence, the country's regulations covering resource circulation have tended to target only limited types of products that are disposed of and become waste. These regulations cover the recycling of individual categories, including containers, packaging, home appliances and End-of-Life Vehicles (ELVs). Various resource circulation regulations have therefore been successively developed and enacted since the 1990s, as presented below in Figure 4, which shows the current framework of the resource circulation in Japan (see also Aoki et.al (2019)).

[22]Roadmap for Popularizing the Development and Introduction of Marine Biodegradable and Bio-based Plastics, https://www.meti.go.jp/english/press/2019/0507_002.html

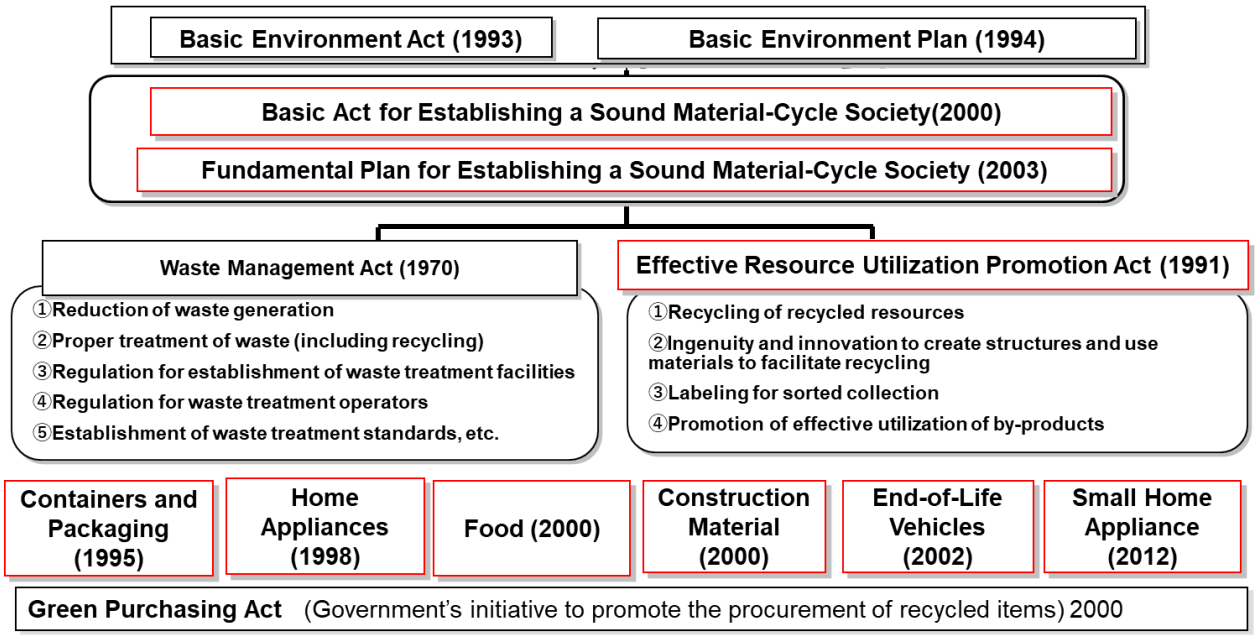

Figure 4: Current regulatory framework of resource circulation in Japan[23]

The above policy architecture is made up of various pieces of legislation aiming to facilitate resource circulation and the SCMS, some of which are presented below.

Waste Management and Public Cleansing Act (1970)

The *Waste Management and Public Cleansing Act* (the *Waste Management Act*) sets the definitions of waste, responsibilities for waste treatment, and waste treatment procedures. Waste is defined as anything which is intended to be disposed of because it no longer has any monetary value. Recyclable materials purchased are not governed by this Act.

This Act strictly regulates the waste collection and treatment industry, and has sometimes become a barrier to more flexible waste management and recycling activities. For example, the responsibility for collection and treatment of municipal solid waste is restricted to the municipalities through this Act, so businesses have difficulty obtaining permits for waste collection and treatment. This Act is regularly amended for better management of waste treatment and recycling (for example, recent amendments were made in 2004, 2010 and 2017).

Amendment to the Effective Resource Utilization Promotion Act (2001)

The purpose of the Act (passed in 1991, amended in 2001) is to promote recycling in various industries. It does not determine detailed procedures on how to recycle a specific material. Rather, it describes the general goals and guidelines for various industries. Based on the 2001 amendment to this law, electrical industries have designed and implemented their own recycling systems for PCs and small rechargeable batteries. For example, PCs sold in Japan for home use carry an additional fee for recycling so that users do not need to pay for disposal, and small rechargeable batteries are collected at retail shops free of charge, to then be recycled by industry.

[23] Reference: https://www.env.go.jp/en/recycle/smcs/attach/hcswm.pdf

Act for the Promotion of Sorted Collection and Recycling Containers and Packaging (1995, entirely enforced since 2000)

The purpose of this Act is to reduce the quantity of containers and packaging waste by promoting recycling of municipal waste, and was the first to apply EPR principles in Japanese legislation. According to the Act, producers must either collect containers and packaging waste, or pay a recycling fee, as summarised hereafter:

- "Producers", which are considered as the liable parties under the Act, include: manufacturers of containers and packaging; users of containers and packaging such as manufacturers of food and other consumer goods, importers of goods; as well as retail shops that provide plastic shopping bags and other containers and packaging.
- Each producer pays a recycling fee based on the weight sold, with a fixed unit price. This unit price is determined according to the product material and its application, and does not reflect the recyclability of each product. This means that many producers commit to recycling only indirectly by paying the fee.
- Targeted materials include metals, glass bottles, cardboard and other paper, PET bottle and other plastics. Focus is placed on the containers and packaging that do not have enough value in the secondary materials markets: glass bottles, papers other than cardboard and paper cartons, PET bottles and other plastics are all subjected to the producers' responsibility. In contrast, steel and aluminium cans, cardboard and paper cartons are excluded from this scope because they are treated in secondary materials markets.
- Only household waste discharged by consumers and collected by municipalities is covered. Containers and packages from commercial activities such as restaurants and shops are not included.
- The Japan Containers and Packaging Recycling Association,[24] set up to help enforce the Act, is to serve as an intermediary between the municipalities and recycling companies for transactions involving containers and packaging waste.

Under this Act, the following results have been recorded:

- It is estimated that 3.36 million tons of containers and packaging plastic waste were disposed of as municipal waste in 2018, and 0.87 million tons as industrial waste.[25] The annual quantity of collection and transactions in accordance with the Act reached approximately 1.2 million tons in that year, including 0.21 million tons of PET bottles, 0.65 million tons of other plastics, 0.34 million tons of glass bottles, and a small amount of paper. This represents about 14% of the total volume of recycled municipal waste. Producers paid a total of JPY 3.8 billion (EUR 30 million) for recycling in 2017. More than 90% of this cost was for plastics recycling (excluding PET bottles). Most of the other materials (including PET bottles) were bought by recycling companies.
- Among the 0.65 million tons of plastics other than PET bottles, 0.34 million tons went to material mechanical recycling. Typical products from recycled plastics include secondary

[24] Reference: https://www.jcpra.or.jp/english/tabid/603/index.php (English top page)
[25] Reference: https://www.jcpra.or.jp/law_data/tabid/988/index.php#Tab646

resin, transportation pallets and various construction parts.[26] The remaining 0.31 million went to chemical feedstock recycling (see Section 6 in this chapter).

- Mandatory charges on plastic shopping bags have been implemented since July 2020 in an amendment to this Act (see Box 3).

Box 3: Mandatory charge for plastic shopping bags (July 2020-)

Box 3: Mandatory charge for plastic shopping bags (July 2020-)

The Japanese government (METI and MOEJ) announced regulations and guidelines for a mandatory charge for shopping bags starting from July 2020, covering plastic bags with handles provided to consumers, with some exemptions to the regulations. These include: reusable bags made with thick plastic of more than 50 micrometers; 100% marine biodegradable certified plastic bags; and plastic bags made of 25% or more bio-based plastic with this percentage increasing in the future.

In August 2020, it was reported that more than 75% of customers had refused charged shopping bags at convenience stores, whereas previously, only 25% of them had refused free shopping bags.

Source: https://www3.nhk.or.jp/news/html/20200812/k10012563231000.html

Act on the Recycling of Specified Kinds of Home Appliances (1998, entirely enforced since 2001)

This Act applies to end-of-life televisions, air conditioners, washing machines, and refrigerators. In accordance with this Act, consumers are required to pay a recycling fee when they dispose of these home appliances (approx. EUR10 to 40 per unit). Most fees are collected at retail shops at the time of disposal. Home appliance manufacturers are also required to build recycling facilities that work with recycling companies. There are 47 such recycling facilities in Japan (as of 1 October 2016) since the implementation of the Act.

According to the Association for Electric Home Appliances,[27] in FY2017, a total of 12 million items (0.5 million tons) of these home appliances were collected and treated. About 86% of the total weight was recycled as metals, glass and plastics. However, the treatment method for plastics is not reported annually. A 2006 report shows that 58.7% of a total of 102,000 tons of plastic was recycled, while most of the remaining volume was disposed of, including via thermal recovery.[28]

The Ministry of the Environment Japan (MOEJ) has also reported cases of illegal dumping of these home appliances every year since the Act was first enforced in 2001. In 2001, there were 138,500 cases (i.e. 138,500 items) of illegal dumping, with this number increasing to a peak of 176,400 items in 2003. Since then, illegal dumping has gradually decreased, except in 2009 (recession) and 2011 (East Japan earthquake). The latest data for 2018 put the number at 54,200 items, a figure that is less than 0.5% of all items collected in accordance with the Act.[29]

[26] Reference: https://www.jcpra.or.jp/recycle/recycling/tabid/432/index.php (Examples of product, in Japanese)
[27] Reference: https://www.aeha.or.jp/recycling_report/ (in Japanese)
[28] Reference: https://www.env.go.jp/council/former2013/03haiki/y0319-05/mat02.pdf (in Japanese)
[29] Reference: https://www.env.go.jp/press/files/jp/113131.pdf (in Japanese)

Construction Material Recycling Act (2000, entirely enforced since 2002)

The purpose of this Act is to ensure appropriate management and promotion of recycling of construction and demolition waste. In FY2018, 74.4 million tons of construction and demolition waste (excluding soil) were generated, most of which was concrete and debris.[30] Plastic waste accounted for 0.5 million tons of this, and a certain amount of plastic waste may have been present in the 2.3 million tons of mixed waste. The recycling rates for both plastic waste and mixed waste stood at approximately 50%.

Act on the Recycling of End-of-Life Vehicles (2002, entirely enforced since 2005)

Traditionally, ELVs have been recycled as steel and other materials within the recycling market. However, the remaining parts of ELVs, namely automobile shredder residue (ASR), chlorofluorocarbon and hydrofluorocarbon (CFCs and HFCs), and airbags, are very difficult to recycle in the market. This Act encourages car manufacturers and importers to treat these three items appropriately. The system of the Act ensures that when consumers buy a new car, they pay an additional recycling fee. The payment is managed by the Japan Automobile Recycling Promotion Center (JARC), which pays a recycling fee to designated recycling companies, provided they treat the three items appropriately. A 2005 report shows that recycled plastic from ELVs only accounted for 6% of an annual total of 400,000 tons of plastic produced by the industry.[31] Most of the remaining volume was ASR treated by thermal recovery.

Act on the Promotion of Recycling of Small Waste Electrical and Electronic Equipment (2012, enforced since 2013)

The purpose of this Act (*Small Home Appliances Recycling Act*) is to promote the recycling of electrical and electronic equipment other than home appliances, which are recycled in accordance to other legislation. The targeted equipment is anything powered by electricity or batteries in households such as mobile and land-line phones, cameras, audio-visual equipment, and electrical cooking equipment[32]. These items are disposed of as municipal waste from households.

Each local government is expected to collect them separately from other waste and entrust this service to designated recycling companies. However, detailed enforcement depends on each local government. In FY2015, 70% of local governments (1,219 local governments out of 1,735), covering 86.8% of the Japanese population, had already started separate collection in accordance with this Act. That same year, a recorded total of 67,000 tons of equipment was collected, and 93% of this was recycled, including via thermal recovery of plastic.

[30] Reference: https://www.mlit.go.jp/sogoseisaku/region/recycle/d02status/d0201/page_020101census.htm (in Japanese)
[31] Reference: http://www.jrcm.or.jp/works_reports/16R11.pdf
[32] This Act (on the Promotion of Recycling of Small Waste Electrical and Electronic) covers any electrical equipment other than PC, small rechargable battery, television, air conditioner, laundry machine and refregirator, which are coverd by the Act on Recycling of Specified Kinds of Home Appliances

Section 3 – key insights

- Regulations governing plastic and resource circulation have been enacted for individual product categories and have contributed to improvements in waste management and recycling in Japan.
- However, each recycling regulation tends to be confined to its product category. There is no system to enable open transactions of secondary materials between sectors.
- The Waste Management and Public Cleansing Act sometimes acts as a barrier to more flexible waste management and recycling activities. For example, the responsibility for collection and treatment of municipal solid waste is restricted to the municipalities, making it difficult for businesses sectors to obtain permits for such activities. The Act is therefore regularly amended to allow better management of waste treatment and recycling.

4. Snapshot of recent government-led activities

In Japan, resource recycling is mainly governed by the Ministry of the Environment (MOEJ), whereas production is under the remit of the Ministry of the Economy, Trade and Industry (METI). Though their roles are segregated, they are seeking to enhance mutual collaboration, especially in the area of plastics.

MOEJ: Resource Circulation Strategy for Plastics (2019), Plastics Smart Forum and Campaign (2018-), and working groups

Over the years, the MOEJ, as the competent authority for plastics issues from the viewpoint of waste management and environmental protection, has spearheaded several initiatives involving government and other actors.

One of the most prominent policies includes the 2019 Plastics Strategy (see section above and Appendix I), developed by the MOEJ and published under its name and those of eight other ministries in May 2019.

Among other initiatives, the MOEJ has also organised the Plastics Smart Forum to allow information exchange between different types of organizations, and launched the Plastics Smart Campaign. This campaign mainly addresses the MPL issue and promotes good practices such as 3Rs for plastics and the cleaning of rivers and seashores, among other things. As of February 2020, it had 506 members including various types of companies, local governments, associations, NGOs, schools, etc. IGES is a member of the campaign.[33]

In 2019, the MOEJ also led the Marine Litter Zero Award competition, in which eight applicants were awarded a prize. Winning initiatives include riverside cleaning by an NGO, edible plastic packages by a company, plastic recycling machinery by a company, research by high school students, and other 3Rs and awareness projects.[34]

[33] Reference: http://plastics-smart.env.go.jp/en/
[34] Reference: https://uminohi.jp/umigomizero_award2020/announcement.html (Japanese only)

More recently, in 2020, MOEJ organised three working groups as part of the Resource Circulation Strategy for Plastics, including:

- A joint working group involving the Central Environment Council (high level council of the MOEJ) and the Industrial Structure Council (high level council of the METI), which have been set up to work together on the effective implementation of the 2019 Plastics Strategy.[35] The working group released a recommendation report for plastic resource circulation in January 2021. To complement the 2019 Strategy, they recommend to:
  - ✓ Improve product design for more reusability and recyclability (eco-design).
  - ✓ Modify waste collection system for more effective recycling of plastic waste. Separate collection and recycling system of packaging and container waste from household under the current regulation should be integrated with other household plastic wastes and packaging and container from commercial activities.
- A closed research group involving the MOEJ and the METI, overseen by the Japanese Government's Financial Services Agency, on "Finance for the circular economy and plastic resource circulation",[36] to discuss how sustainable financing could be applied to boost closed-loop plastics. The group released a final report titled as "Guidance for disclosure and dialogue to promote sustainable finance related to the circular economy" in January 2021. The report indicates six pathways that can help encourage information disclosure by companies, as an essential element to attract investors towards circular economy. Disclosures should cover: (1) values, (2) business models, (3) risks and opportunities, (4) strategies, (5) indicators and targets, and (6) governance.
- A committee commissioned to prepare a "Roadmap for introducing bio-plastics", organised by the MOEJ in tandem with the Cabinet Office, the MAFF, and the METI,[37] whose work can support the achievement of the government's 2030 bio-plastics target. The committee released "Roadmap for introducing bio-plastics" in January 2021. The topics in addition to the 2019 Strategy are as follows:
  - ✓ Make full use of the values of biomass and bio-degradable plastics to reduce environmental burden.
  - ✓ Develop biomass plastics that are equivalent in quality to petrochemical plastics, to facilitate joint recycling of both types of plastics.
  - ✓ Use bio-degradable for the following applications:
    - ✧ Waste collection bags for compostable and anaerobic digestion purposes.
    - ✧ Plastic films used in agricultural fields.
    - ✧ Other purposes that potentially and unintentionally outflow into ocean.

The work and conclusions of these three working groups are expected to contribute to future policymaking. They are still at the stage of collecting information and opinions from stakeholders and experts.

In January 2021, MOEJ and KEIDANREN announced their agreement to launch "Circular Economy Partnership" (Japan Business Federation) in January 2021.[38] The purpose of the partnership is to promote the circular economy in Japanese business sector and develop their

[35] Reference: https://www.env.go.jp/council/03recycle/yoshi03-14.html
[36] Reference: http://www.env.go.jp/recycle/post_60.html and http://www.env.go.jp/press/108893.html
[37] Reference: http://www.env.go.jp/recycle/post_58.html
[38] Reference: http://www.env.go.jp/recycle/recycle/circul/CEpartnership.pdf (See next section about KEIDANREN)

presence in the global market. They are planning to start information sharing and discussion about the circular economy.

METI: Circular Economy Vision (2020) and CLOMA (Japan Clean Ocean Material Alliance) (2019-)

The Japanese Ministry of the Economy, Trade and Industry (METI) also handles plastic issues, from an industrial perspective. Some of the recent initiatives led by METI are presented below.

In May 2020, the METI released its Circular Economy Vision 2020, replacing the 1999 version. This CE Vision 2020 was developed by a research group within the METI and published solely under its name. It provides an overview of global circular economy trends, especially focusing on EU actions (e.g. a EU carbon border tax), a detailed proposal for EPR modulation, as well as details for standards of reparability. It also emphasises the need for Japanese, industry to proactively engage with the EU, in order to avoid losing competitiveness in the EU market. It also points out that the EU's policy efforts would be an opportunity for Japanese companies to provide information on Japanese circular technologies. Though the vision itself is not very detailed, it clearly states that the production and services industries should design more circular products and services to construct a circulating system that includes recycling.[39]

Furthermore, the METI has spearheaded the establishment of CLOMA, an alliance of industries working to address marine plastic issues. However, it is a voluntary initiative by industries, and the METI is not directly involved (see next section for details).

MAFF: Action Declaration of Plastic Resource Circulation (2018 -)

The Japanese Ministry of Agriculture, Forestry and Fisheries (MAFF) has also carried out actions to fight against plastic waste, and it announced in 2018 the *Action Declaration of Plastic Resource Circulation*. This is a campaign aimed at collecting good practices from stakeholders in the areas of food, agriculture, and fisheries. As of February 2020, there were a total of 95 declarations from food production companies, retail chains, restaurant chains and food packaging companies, as well as from associations in the food industry, agriculture, and fisheries. Their commitments include 3Rs for plastic packages, awareness raising and cleaning activities.[40]

Fishery Agency: Future efforts for plastic resource circulation in the fisheries industry (2019)

The Fishery Agency is one of the organisations under the aegis of the MAFF and also works on the issue of MPL.

In Japan, each fisheries operator is responsible for, and pays for the appropriate treatment of waste from fishing activities including waste fishing gear. In 2019, the agency issued a policy paper aimed at tackling the pollution arising from fishing activities and gear, including the ALDFG (Abandoned, Lost, or otherwise Discarded Fishing Gear) issue. The policy, named "Future efforts for plastic resource circulation issues in the fishery industry", can be summarised as follows:[41]

- As of 2019, approximately 20,000 tons per year of plastic were used for fishing gear in Japan. This did not include ships which are made of plastic (often fibre-reinforced plastic (FRP)), nor containers for caught fish. There were no statistics on how such waste is treated, and certain items were thought to flow unintentionally into the ocean. Such used fishing gear should be treated appropriately on land.

[39] Reference: https://www.meti.go.jp/press/2020/05/20200522004/20200522004-2.pdf (Japanese only)
[40] Reference: https://www.maff.go.jp/j/plastic/torikumi.html (Japanese only)
[41] Reference: https://www.jfa.maff.go.jp/j/sigen/action_sengen/190418.html

- Future efforts should focus on preventing waste outflow into the ocean. Used fishing gear should be brought back to land and treated appropriately, and recycling technologies should be improved. Environmentally friendly fishing gear incorporating biodegradable plastic should be developed.
- Collection of marine litter by fisheries operators should be promoted. For waste caught by fishing nets, support systems such as seashore cleaning should be encouraged. Support systems for fisheries operators should be put in place, and voluntary efforts, whereby the volunteers would not have to pay for waste treatment, should be considered.
- Efforts to prevent intentional illegal disposal of waste should be led, and enforcement of existing regulations should be reinforced, including through awareness-raising activities.

In 2020, the MOEJ and the Fishery Agency revised the Guidelines for fishery waste treatment in response to the MPL issue. These guidelines do not put forward any additional measures, but instead explain the required waste management procedures, in accordance with the existing *Waste Management and Public Cleansing Act.*

MHLW: Guidelines on using recycled plastic materials for food cutlery and packaging (2012)

The Japanese Ministry of Health, Labour and Welfare (MHLW) also issued guidelines on using recycled plastic materials for food cutlery and packaging in 2012. They include a restriction on the use of mixed secondary plastics materials, if in contact with food products.[42]

Section 4 - key insights

- The MOEJ and METI have stepped up their collaboration to tackle the plastics issue. Resource Circulation Strategy for Plastics (2019), the first integrated policy for plastic in Japan, is one of the outcomes of this collaboration.
- Though the Circular Economy Vision (2020) underscored the importance of the EU Circular Economy, this document was developed by a research group within the METI and has not attracted much attention yet.

The above section presented various initiatives led by Japanese Ministries. The following section covers those led by businesses.

5. Snapshots of recent business-led activities

In addition to the Ministry-led efforts presented above, Japanese business associations also play an important complementary role in improving the quality of activities led by Japanese companies in response to the plastic issue. These associations develop business strategies and targets that echo national policies, and issue voluntary standards and guidelines. The eco-design guidelines for home appliances and PET bottles, developed with the support of business associations, are a good example of the contribution of such business associations, as presented in the following section.

[42] Reference: https://www.mhlw.go.jp/file/06-Seisakujouhou-11130500-Shokuhinanzenbu/pura.pdf (Japanese only)

CLOMA (Japan Clean Ocean Material Alliance) (2019-)

CLOMA is an alliance of industries formed to address marine plastic issues. CLOMA was initiated mainly by the METI. However, it is a voluntary initiative and the METI is not directly involved but provides support in organising the alliance in accordance with the national plastic strategy framework. Currently, 325 companies and organisations participate in the alliance. Most of them are manufacturers of plastics and other materials, and the others are users of materials such as food industry and retailers. Members have declared a wide range of ambitions including 3R promotion, but progress has been particularly strong in the development of alternative materials, such as biomass and biodegradable plastics, and non-plastic packaging.[43] One example of this is the marine biodegradable plastic developed by KANEKA.[44]

The Japan Plastics Industry Federation (JPIF): Resource circulation strategy for plastics (2019)

JPIF is the most integrated plastics industry association in Japan. It comprises mainly plastic raw materials producer companies, intermediate manufacturing companies, and related sub-category industrial associations,[45] including those for plastic recycling.[46,47]

A representative member of JPIF joined the MOEJ committee to develop the national 2019 Plastics Strategy (see chapter 2). In May 2019, JPIF also issued its own Resource circulation strategy for plastics, in response to the national Plastics Strategy. It outlined its position, strategy, and challenges from the practical viewpoint of the plastic industry, along with the national Plastics Strategy. The JPIF's Strategy is summarised in the Appendix II.[48]

The JPIF's Strategy outlines some recycling challenges and explains that due to these, the quantity of recycled material has not increased since 2006, when it reached 2 million tons. These difficulties include:

- Businesses are still purchasing high quality raw plastic for their virgin or recycled products. The positive environmental value of recycled products is not appreciated by these businesses.
- Material recycling is difficult for many reasons:
  - ✓ A huge range of materials are manufactured in small quantities.
  - ✓ Numerous different and complex materials are used, especially for packaging.
  - ✓ Products are often contaminated or mixed with other materials such as food.
  - ✓ Large-scale composting for municipal waste is not widely implemented in Japan. Thus, robust evidence of the impact of bio-plastic degradation has not been established yet.
  - ✓ Chemical recycling methods, which are a promising technology, are limited to the utilisation of shaft furnaces, coke furnaces and gasification. Only a small amount of plastic is recycled using these methods, while the rest is utilised for chemical reaction or thermal recovery.

[43] Reference: https://cloma.net/english/
[44] Reference: https://www.kaneka.co.jp/en/business/material/nbd_001.html
[45] Reference: http://www.jpif.gr.jp/english/index.html
[46] Reference: http://www.pwmi.or.jp/ei/index.htm "Plastic Waste Management Institute" shows some information about plastic recycling
[47] Reference: http://npy-k.jp/seihin/syaryou.php "Japan Plastic Utilization Association" introduces products made from secondary plastic by the member companies.
[48] Reference: http://www.jpif.gr.jp/english/resource_circulation_strategy_for_plastics.pdf

In contrast, the JPIF points to the following strengths of the Japanese resource circulation:

- Separate collection of plastic waste, which is fundamental to effective recycling, is widespread throughout society.
- Waste incinerators with energy recovery are widely used. 65% (22 million tons) of municipal solid waste incinerated in Japan (34 million tons) is treated by incinerators that provide electricity or heat to outside facilities (so called "Waste-to-Energy plants").[49] The efficiency of electricity generation was 12.59% in 2015 and has progressively improved.[50]
- High recycling rates for PET bottles (85%) and polystyrene foam (54%) are recorded.

However, the basic concept of the Strategy is "optimum plastic utilisation", without any emphasis on reduced usage or circularity.

KEIDANREN

KEIDANREN (Japan Business Federation) is an umbrella economic organisation with a membership of 1,412 companies in Japan, 109 nationwide industrial associations, and 47 regional economic organisations (as of April 1, 2019).

Its mission is to draw upon the vitality of corporations, individuals and local communities to support corporate activities which contribute to the sustainable development of the Japanese economy and improved quality of life for the Japanese people.[51]

In 1991, Keidanren compiled the "Keidanren Global Environment Charter" in which it declared that it would promote voluntary efforts for environmental conservation (Keidanren, 2019). The Charter mainly consisted of industrial waste reduction and CO_2 reduction measures. Since 1999, the organisation's common waste reduction target has been to reduce the landfill volume of industrial waste. In 2016, the waste reduction section of the charter was amended to become the "Voluntary Action Plan for Establishing a Sound Material-Cycle Society". In addition to reducing landfill volume, it declared that each industrial sector would voluntarily set appropriate industry-specific numerical targets for resource circulation, accommodating industrial characteristics and circumstances. The results are reported each year, with some key ones listed below:[52]

- In 2018, to address the plastics issue, the organisation started urging member industrial sectors to set additional targets related to plastics. As a result, 43 targets were declared from 20 industrial sectors, rising to 83 targets from 39 industrial sectors in 2019.[53]
- With regard to Keidanren's 83 sectoral targets from 39 industrial sectors:
  - ✓ They are in line with the principles contained within the "Resource circulation strategy for plastics".
  - ✓ Some electrical companies have introduced good practices to utilise more recycled plastics in their products, but have not adopted quantitative targets for the uptake of recycled plastics.
  - ✓ No actions or targets have been announced by the automotive industry.
  - ✓ Associations of convenience stores and retail chains have targets of reducing plastic shopping bags.

[49] Calculated from data of MOEJ (2017)
[50] Reference: https://www.env.go.jp/recycle/misc/guideline/5kodokamanyuaru.pdf
[51] Reference: https://www.keidanren.or.jp/en/profile/pro001.html
[52] Reference: https://www.keidanren.or.jp/en/policy/2019/032.html
[53] Reference: https://www.keidanren.or.jp/policy/2020/020.html (*Latest version has not been translated yet.)

- Keidanren also compiled industry best practices under its 2018 publication, called "Contributing to the UN SDGs through Measures Addressing Plastic Waste Issues: Efforts toward a positive future for plastics" ("SDGs Plastic Issues", see box 4 below). The third 2019 edition contains 300 good practices from 164 member companies and organisations relating to 3Rs and other actions.[54]
- Keidanren announced it launched a "Circular Economy Partnership" with MOEJ in January 2021 (see previous section).

Box 4: Extract from Keidanren's "SDGs Plastic Issues": good practices to utilise more recycled plastics for home appliances

> **Box 4: Extract from Keidanren's "SDGs Plastic Issues": good practices to utilise more recycled plastics for home appliances**
>
> Keidanren has reported the following company-led efforts for more sustainable plastics:
>
> - Sony utilised 18,000 tons of recycled plastics (which might include mixed virgin material and additives) in FY2017. 66% of the volume was derived from Sony's manufacturing waste, and the other 34% was from used products or packaging.
> - Toshiba's target is to utilise 3,000 tons of recycled plastics through to 2020 (cumulative).
> - Hitachi utilised 777 tons of recycled plastics derived from used products and packaging in their products such as refrigerators, laundry machines, microwave ovens, and packaging for products in FY2017.
> - Panasonic utilised 14,300 tons of recycled plastic from their home appliances recycling factory in their products such as air conditioners, induction heating cooking heaters, and refrigerators in FY2017.
> - Mitsubishi Electric introduced technology allowing 70% of waste plastics from their home appliances recycling factory to be recycled into new products.

Association for Electric Home Appliances (AEHA)

AEHA was established in 1973 as an umbrella association for home electric appliances manufacturers, and now comprises 29 manufacturers and 11 home appliances associations. AEHA works to improve the safety of a wide variety of household appliances, as well as enhancing after-sales service and product liability. It also leads research and policy implementation activities. Its work is articulated around an understanding of problems common to household appliances, including environmental ones, such as dealing with used appliances or energy and resource conservation.[55]

One of its first notable environmental publications was its "Products Assessment Manual" for eco-design, released in 1991, which outlines guidelines for the effective evaluation of eco-design procedures in electronic appliances, including usage of secondary materials, reduction of package, durability, hazardous material, recyclability and safety. These guidelines have since been revised to ensure up-to-date information in line with technological progress, and the 5th (and

[54] Reference: https://www.keidanren.or.jp/en/policy/2018/099.html
[55] Reference: https://www.aeha.or.jp/global/about.html

last) version was issued in 2014. It has also published labelling guidelines for packages, plastic parts materials, and decomposing instructions.[56]

The AEHA is also in charge of implementing the Act on the Recycling of Specified Kinds of Home Appliances. It publishes recycling statistics on these home appliances annually.

The Council for PET Bottle Recycling

This Council is an industrial organisation that promotes the recycling of PET bottles. Its members are sub-category product associations such as those for soft drinks, *shochu* (Japanese distilled alcoholic drink), soy sauce, and fruit drinks. Each sub-category product association is mainly made up of manufacturers of each product.

The Council has been issuing voluntary design guidelines for PET bottles since 1992. Revisions to the guidelines in 2001 included a recommendation to not use coloured bottles or aluminium caps so as to improve recyclability. These guidelines contribute to maintaining a high recycling rate for PET bottles in Japan (84.6% in FY2018).[57] Among the sub-category product associations, only the Japan Soft Drink Association actively promotes recycling of PET bottles,[58] while other product associations do not promote PET bottle recycling on their websites.

Plastic Packaging Recycling Council (PPRC)

The PPRC was established by organisations and companies which have an obligation to recycle plastic containers and packaging in order to promote this recycling in Japan. The council members are mainly packaging materials producers and manufacturers of foods and consumer products.[59]

In 2015, it issued “Voluntary Design Guidelines for Environmentally-friendly Plastic Packaging (tentative)”, but these guidelines are not very detailed. In 2019, it also released a strategic document, called the “2030 Declaration on Plastic Packaging Resource Circulation”, which basically echoes the strategy of the Japanese government.

Japan Plastic Recycle Association

This association comprises recycling companies and their regional associations. Its 130 members are all small and medium-sized companies. Information on products that have received a carbon footprint certification by a third-party organisation is available on the association’s website. It does not publicly issue any standards or guidelines on plastic recycling.[60]

Japan BioPlastics Association

The Japan BioPlastics Association (JBPA) was the new name given to the Biodegradable Plastics Society of Japan in 1989. Since then, with more than 200 member companies, JBPA has promoted the recognition and business development of biodegradable plastics and bio-based plastics in Japan.

JBPA acts in close cooperation with its US (Biodegradable Products Institute), EU (European Bioplastics), Chinese (Biodegradable and Biobased Materials Group) and Korean counterparts, and holds discussions about various technical issues, such as analytical methods to evaluate biodegradability, product specifications, and recognition and labelling systems. JBPA views close collaboration with other countries as very important, especially with the rapid development of activities in this area.[61]

[56] Reference: https://www.aeha.or.jp/environment/ (in Japanese only)
[57] Reference: http://www.petbottle-rec.gr.jp/english/design.html
[58] Reference: http://j-sda.or.jp/about-jsda/english.php
[59] Reference: http://www.pprc.gr.jp/en/profile.html
[60] Reference: http://www.jpra.biz/ (in Japanese only)
[61] Reference: http://www.jbpaweb.net/english/english.htm

JBPA issues standards on both biodegradable and bio-based plastics, which are then used as labels for sold products (see chapter 4).[62]

Japan Business Initiative for Biodiversity (JBIB)

JBIB is a group of Japanese corporations committed to biodiversity conservation. The initiative was launched in 2008 with 14 companies. It has now grown into a group of 55 leading companies representing a range of different business fields. Its objective is to progress towards the goal of balancing business operations with the need for biodiversity conservation. JBIB also addresses MPL issues.[63]

Japan Environment Association, Eco Mark Office

Eco Mark is the only ISO Type I environmental labelled entity in Japan[64], and the Japan Environment Association (JEA) acts as its Secretariat. Eco Mark is also a member of the Global Ecolabelling Network, which includes the EU Ecolabel and the German Blue Angel. In February 2020, it published its "Basic policy for plastic resource circulation for Eco Mark" to enhance the circular approach to plastics. This policy also includes the organisation's standpoint on bio-based plastics (see chapter 4).

Automotive sector: Draft proposal of incentive system for secondary materials (2017)

In 2014, the METI and the MOEJ organised a working group with automotive industries for vehicle recycling, which led to the development of a draft proposal for a recycling incentive system in 2017. The proposed system is to reduce the recycling fee paid by consumers when they buy new vehicles that utilise more recycled plastics.[65] A related report was issued by the Japan Foundation for Advanced Auto Recycling.[66] The report evaluates the possibility of recovering plastic parts from ELVs and recycling them as secondary raw materials for new vehicles. The report shows that recycling is technically possible and can contribute to reducing CO_2 from ASR (automobile shredder residue) incineration, but that the cost of the recycled materials would be higher than that of virgin materials. It also points out that recovered plastic parts could contain hazardous substances that are currently prohibited. After the release of this draft proposal, however, this topic has not appeared in METI or MOEJ committees for ELVs recycling.

These considerations seem to relate only to plastics that are derived from ELVs and do not include other plastics from industrial and municipal waste, such as containers and packaging. Annual ASR generated in Japan is approximately 0.5 to 0.6 million tons, with more than 70% of it treated by incineration with energy recovery.

[62] Reference: http://www.jbpaweb.net/english/b-1_201811.pdf
[63] Reference: http://jbib.org/english/
[64] Reference: https://www.globalecolabelling.net/assets/Uploads/GEN-Member-Cooperation-Eco-Mark-experience.pdf
[65] Reference: http://www.env.go.jp/council/03recycle/y033-45/mat04_2.pdf (in Japanese only)
[66] Reference: https://j-far.or.jp/wp-content/uploads/2019report_YRI.pdf (in Japanese only)

Section 5 - key insights

- Efforts led by Japanese business associations tend to support the government's policies.
- Recyclable product design standards issued by production associations, such as for electric home appliances and PET bottles, help to establish successful recycling systems.
- In contrast, recycling business associations have not issued standards for recyclable product designs.
- Most recycling systems are established within a closed product category. The market for secondary plastic materials does not seem to be well developed.

6. Snapshots of advanced technology or company-specific solutions

In addition to the business activities presented above, there are also several interesting and advanced technological solutions for plastic resource circulation led by Japanese companies. This section will present some examples covering four categories: chemical recycling, weight reduction for plastic bottles, papers, and returnable service.

Chemical recycling (Feedstock recycling)

Compared to conventional material (mechanical) recycling, chemical recycling is a set of more recent technologies which offers promising prospects and has advantages (but also challenges) over mechanical recycling. Generally, such technique can treat a wider range of secondary materials. However, it requires larger scale chemical plants and more complicated technology. Several chemical recycling methods for plastic exist, or are under development, as presented below.

Under the national Containers and Packages Recycling Act, a total of 647,000 tons of plastic (excluding PET bottles) were collected and 424,000 tons were recycled in FY2018. Out of these, 180,000 tons were put into material recycle, and 243,000 thousand tons were put into chemical recycling. These numbers only include the materials treated under the Act, and additional amounts might have been treated out of the scope of the Act.[67]

Among these 243,000 chemically-recycled tons, 170 tons were treated using coke ovens (i.e. by Nippon Steel), through which approximately 40% of the volume is recovered as petrochemical raw material to produce plastics and other materials. The rest would have been utilised as coke substitution in steel shaft furnaces and for thermal recovery.

Other methods of chemical recycling involves gasification to produce mainly ammonium, such as the company Showa Denko does, or to use the plastic as a reductant agent of shaft furnaces, such as the company JFE does. In FY2018, a total of 46,000 tons and 27,000 tons were treated using these methods, respectively.

Monomerization technology, which allows the useful decomposition of the polymer to form monomers, is another chemical recycling process used in Japan. It was developed by Teijin, a Japanese chemical company, which started this method in 2003 and applies it mostly to recycling

[67] Reference: https://www.jcpra.or.jp/english/tabid/612/index.php

of PET bottles including bottle-to-bottle recycling.[68] Monomerization of other waste plastics to recycle them into raw material is under development at several companies and research institutes.

The Japanese firm Sekisui Chemical has also developed a technology to produce ethanol from the flue gas of municipal waste incinerators. It has trialled the technology at a small pilot scale plant, and is now going to construct a verification plant combined with a municipal waste incinerator in Kuji City, Iwate Prefecture. The company Sumitomo Chemical is cooperating in the project to produce polyolefin from the ethanol produced by Sekisui from waste.[69]

Weight reduction for plastic bottles

Weight reduction for plastic packaging and containers is one of the focuses of the Japanese plastics strategy, as weight reduction also means a reduction in transportation load. This is one of the reasons why glass beverage bottles have been replaced by PET and other types of bottle (see Box 2).

Among various technology-driven efforts, the Council for PET Bottle Recycling has set a target of reducing the weight of PET bottles. In 2018, an average 23.6% reduction in weight per bottle was achieved compared to the 2004 average weight of bottles.[70]

Refill and replacement type bottles for daily-use products, such as shampoo and liquid laundry detergent, have also become increasingly popular. For example, the cosmetics and home care company KAO offered 326 refill and replacement products and reported high refilling ratios for fabric softener and fabric bleach, as of December 2019.[71]

Paper

Alternative paper materials as a substitute for plastic packaging have emerged under the name of several paper companies such as DNP and TOPPAN. Paper is a “mono-material” and easier to recycle, while the plastics for food packaging for example often consist of complex materials which are not suitable for material recycling. One of the key technologies under development is a method to make paper water-resistant.

“Stone paper” is another technology which is made from a mixture of limestone (CaCO3) and plastic. In Japan, the company TBM provides this kind of product, called LIMEX.[72] This material could reduce the consumption of wood used to produce paper packaging. However, there is some criticism of the environmental impact of this kind of material.[73] For example, it cannot be mixed and recycled with other papers.

Returnable service

In addition to technology-specific initiatives, some companies have invested in innovative services, such as the “Loop” service offered by TerraCycle. TerraCycle, a global circular shopping platform, offers services to households with returnable bottles for food and commodities. It started deploying its services in Paris and New York in 2019, and is planning to begin services in Tokyo and other cities.

[68] Reference: http://www.pwmi.or.jp/ei/plastic_recycling_2019.pdf (see page 19)
[69] Reference: https://www.sekisuichemical.com/whatsnew/2017/1325318_29675.html
https://www.sekisuichemical.com/whatsnew/2020/1349043_36556.html
https://www.sumitomo-chem.co.jp/english/news/detail/20200227e.html
[70] Reference: http://www.petbottle-rec.gr.jp/data/weight_saving.html (in Japanese only)
[71] Reference: https://www.kao.com/content/dam/sites/kao/www-kao-com/global/en/sustainability/pdf/klp-pr-2020-e-20.pdf
[72] Reference: https://tb-m.com/en/limex/products/
[73] Reference: http://www.alterna.co.jp/28503 (in Japanese)

Section 6 - key insights

- Among the different technologies developed, expectations from chemical recycling are high, especially for plastics that do not lend themselves readily to material recycling.
- Other businesses are betting on closed-loop services to drive down consumption, given the environmental footprint of alternative technologies.

7. Value chain via retail to consumers: positive and negative aspects

As presented in the above sections, Japanese regulations and the related stakeholders tend to focus mainly on product manufacturing and waste management. However, plastic products are also supplied by retailers to consumers. The connection from producer to consumer through the retailer is called the "value chain". This section provides insights into retailers and consumers and their respective roles in plastic resource circulation.

In Japan, large retail chains tend to be active in certain kinds of environmental activities such as collecting PET bottles, milk cartons, and polystyrene food trays. According to data from the Japan Chain Store Association, 23,577 tons of PET bottles were collected at association member stores in 2018, which was 3.6% of all total PET bottles in Japan.[74] Some retail chains also started to charge for plastic shopping bags prior to the launch of the national regulation enforcing this measure.

Generally, large retail chains in Japan have a strong influence on both producers and consumers with regard to the selection of products that they sell. This means that the more retailers prefer to sell recycling-friendly products, the more producers are likely to provide such products. Assuming that retail chains intend to pursue the separate collection of recyclables at their stores, they would need to focus on the recyclability of the products they sell. This could be a strong incentive for them to choose and sell more recycling-friendly products, especially in terms of packaging.

However, one of the main regulatory barriers to more widespread collection at stores is the Waste Management and Public Cleansing Act, which requires a license for waste collection and transportation. A suitable amendment of this Act would therefore be required.

Advanced IT solutions could enable more sophisticated systems for reusable, returnable, repairable or shared systems to avoid and reduce waste. The massive development of online shopping also provides opportunities to tap into such advanced IT solutions.

However, online shopping also leads to increased consumption of packaging and other negative environmental effects (e.g. transport emissions from delivery).

Awareness-raising activities to make consumers' behaviours more responsible would be necessary. In Japan, for consumer awareness and behaviour change, economic incentive systems often work well, such as the Eco-Point System for home appliances. The scheme, which was in place between 2009 and 2010, resulted in an increase of JPY 2,600 billion (EUR 21 billion) in sales of such appliances, over a budget of JPY 693 billion (EUR 5.5 billion).[75] Recent mandatory charges for plastic shopping bags also seem to have been effective (see Box 3).

[74] Reference: https://www.jcsa.gr.jp/topics/environment/approach.html
[75] Reference: https://www.env.go.jp/council/02policy/y020-60/mat03.pdf (in Japanese)

Furthermore, Japanese consumers respect the rules mandating the separate collection of recyclable materials. These examples offer positive perspectives for future behaviour-change incentive programmes.

Having looked at the roles of retailers and consumers in advancing plastics recycling, different opportunities and risks arise which merit careful consideration, as summarised in Table 2: Positive and negative aspects of the producer, retailer and consumer value chainbelow.

Table 2: Positive and negative aspects of the producer, retailer and consumer value chain

	Producer	Retailer	Consumer
Opportunities	Provide more environmentally-friendly products with aspects such as energy saving and recyclability	Attract ethical consumers with environmental values through products and 3R activities. Allow for collection of recyclables at stores. More potential to focus on environmentally-friendly products.	Buy environmentally-friendly products and services even at higher prices. Voluntarily cooperate with 3R activities.
Risks	Focus on providing products which are cheaper, higher quality, and with more attractive designs. Recyclability and other environmental values are less important for product sales.	Focus on asking producers for cheaper, higher quality, and more attractive designs rather than environmental value.	Focus on choose cheaper, higher quality and more attractive designs rather than environmentally-friendly products.

Section 7 - key insights

- A certain amount of recyclable materials is collected at large retail chains. There is potential to increase the amount and variety of plastics collected through retail chains. In addition, the choice of products on sale could have a strong influence on both producers and consumers.
- One of the barriers to more widespread collection at retail stores is the *Waste Management and Public Cleansing Act*, which requires a license for waste collection and transportation that retailers do not have.
- Japanese consumers are generally cooperative with rules, including those underpinning the separate collection of waste. Economic incentives also seem to be effective tools for encouraging new behaviours, which could be applied to drive forward new recycling efforts.

8. Findings from Japanese stakeholder analysis

This section provides the results of an analysis of Japanese regulations and stakeholders. The results show both structural barriers to, and good practices in resource circulation. These results also point to future challenges for the circular economy.

- Japan has a successful history of waste management and 3Rs. The Japanese framework for recycling consists of sector- and product-specific regulations. In addition, the production side is managed by the METI and the waste side by the MOEJ. Although the METI and the MOEJ have improved their collaboration, especially through the development of Japan's 2019 Plastics Strategy, the areas of production and waste management and each product category still seem deeply divided. For example:
  - ✓ In the Container and Packages Recycling Act, many producers do not commit to recycling directly. Instead they only pay a recycling fee based on weight, which does not encourage them to consider the recyclability of their products. As such, recycling tends to be considered as a waste management and cost issue, not as a production and environmental issue.
  - ✓ An incentive system for the automotive industry to use more secondary plastic is under consideration by the METI and the MOEJ, but the target only covers secondary plastics from ELVs. It does not seem to consider using recycled plastic from other sectors, such as containers and packaging waste.

  Thus, an integrated approach to plastic resource circulation that transcends sectors and involves both the production side and the waste management side is still required.
- There are several good practices related to the circular economy such as recycling of PET bottles and home appliances. In these cases, product design, retail, collection, and recycling work together efficiently. There are also advanced technologies such as chemical (feedstock) recycling and marine-degradable plastics.
- However, these kinds of value chain collaborations are not emphasised in Japan's 2019 Plastics Strategy. There seems to be no proposal to apply these models to other sectors.
- In these cases, business associations play an important role in establishing standards for eco-design. The associations that issue such standards are mainly made up of manufacturing companies, rather than recycling companies.
- Thus, circular economy good practices should be given greater recognition and transferred to other sectors. The recycling industry should also be involved in establishing such a circular system.
- Large retail chains could play a major role in the circular economy, but not much focus has been placed on this aspect yet.
  - ✓ Large retail chains have a strong influence in Japan both on producers and consumers with regard to product selection. This means that the more retailers prefer recycling-friendly products, the more producers are likely to provide such products.
  - ✓ Voluntary actions for collecting PET bottles, milk cartons and polystyrene food trays in stores have been successfully implemented. Such a voluntary approach could be

amplified to cover a greater variety of materials. If retail chains intend to pursue the separate collection of recyclables, they would need to focus on the recyclability of the products they sell. This could be a strong incentive for them to choose and sell more recycle-friendly products, especially in terms of packaging.

- ✓ One of the barriers to more widespread collection at stores is the Waste Management and Public Cleansing Act, which requires a license for waste collection and transportation. A suitable amendment of the Act is necessary.

Thus, large retail chains could take on a greater leadership role to influence producers and consumers, and thus encourage more eco-design and collection of recyclables. The government should prepare the appropriate regulations.

Table 3 below presents a summary of the key factors that are required for a successful recycling system for example of PET bottles and home appliances in Japan. An efficient system will not see the day through a single action, but rather through collaboration of different stakeholders (regulators, designers, consumers, etc.) and systems working together and deploying various coordinated actions.

Table 3: Key factors of success of recycling system – example of PET bottles and home appliances

Actors	PET bottles	Home appliances
Regulators	Containers and Packaging Recycling Act to allow producers to choose to collect and recycle by themselves, or only pay the recycling fee.	Home Appliances Recycling Act established a comprehensive recycling system. Manufacturers are responsible for recycling.
Product designers	"Voluntary design guidelines" by the Council for PET Bottle Recycling enables high quality recycling. PET itself has chemical properties that enable PET-to-PET recycling without deterioration.	"Product assessment manual" by AEHA includes labelling of materials and easy-to-decompose design. This has been well developed because manufacturers are involved in the recycling process.
Consumers	Consumer awareness is important for correct disposal.	Consumers pay a recycling fee when they dispose at collection points (mainly retail shops). There is no other way to dispose.
Waste collectors	Separate collection as municipal and commercial waste is widely implemented. Collection by beverage companies and retail chains at retail shops and vending machines are also promoted voluntarily.	End-of-life products are mainly collected at retail shops and sent to recycling facilities.
Recyclers	Secondary PET can be widely used for bottle-to-bottle recycling, textiles, and other purposes.	Manufacturers have established recycling facilities collaborating with recycling companies. Operation issues are fed back to the manufacturers and AEHA.

Economic incentives	PET has value as a secondary material. Design and separate collection systems increase its value.	Consumers pay for recycling.
Other motivations	The industry was forced to construct recycling systems because introducing PET bottles was considered to increase waste, and was opposed by other stakeholders such as local governments, consumers and NGOs.	A recycling regulation was required because treatment of home appliances was a burden to local governments.

While close and effective collaboration among stakeholders is necessary, some additional factors, such are also required for true circularity to materialize, as Figure 5 below shows. This is a conceptual diagram of the good practices required for a circular economy to emerge, as well as the issues hindering a less circular economy. There is an obvious disconnect between production and recycling. On this point, the "Circular Economy Vision 2020", developed by the METI, states that Japanese production and service industries should design highly circulating products and services to construct a circulating system that includes recycling. Measures to mitigate the identified gaps in existing practices, and to enhance the overall circularity of the system, are discussed in chapter 4.

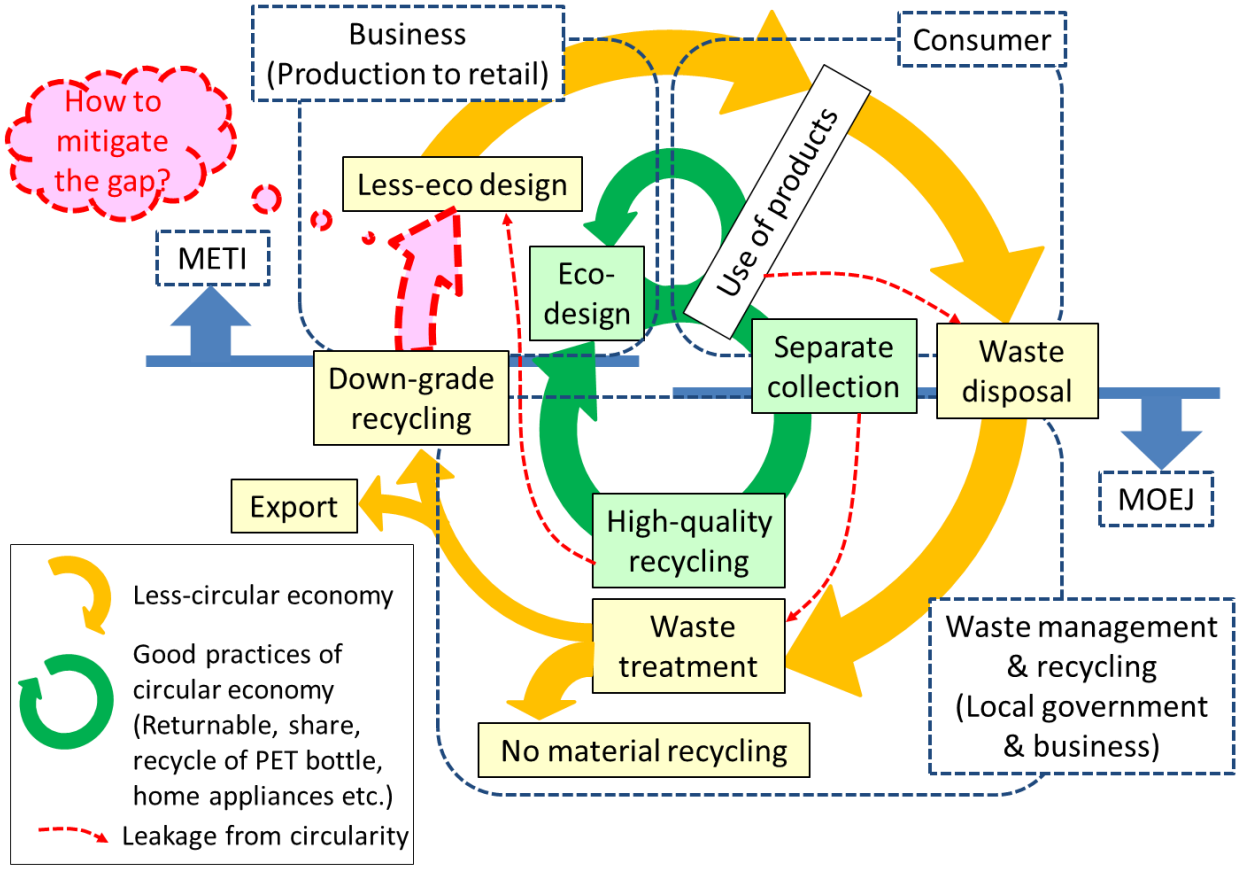

Figure 5: Stakeholder analysis of circular economy in Japan[76]

Chapter 2 – key insights

The Japanese government and business sectors are leading a number of initiatives to spur the circular economy for plastics. Such efforts could be informed by the EU's policies and experiences, some of which are presented here briefly and discussed in greater length in Chapter 4:

- The concept of eco-design is not clearly addressed in Japanese policies, though there are good practices in place in the business sector. More policies and regulatory tools would be necessary to promote eco-design to industries. The concepts of EPR fee modulation and mandatory content of secondary plastics, which are proposed in the EU, could serve as examples of such tools.
- The recycling industry does not appear to be a prominent circular economy actor. In Japan, the collection of municipal waste is conducted by each municipality. The recycling industry works under the municipalities, and does not have much influence on other stakeholders. However, the recycling industry could play a role in ensuring the quality of secondary materials and their supply to packaging and other producers. The industry could also develop a quality standard for secondary plastics, and provide suggestions to all other industries for the recyclability of products. The Government could also support this.

[76] Source: Prepared by the authors

Chapter 3: Circular economy and the plastics issue in the EU

This chapter provides an overview of the evolution as well as current status of EU circular economy policies and initiatives, noting that the concept of "resource efficiency" first appeared about the same time in the EU as in Japan, around 2001[77].

As a scene-setter, the below figure provides an overview of the improvement of EU recycling rates (see **Erreur ! Source du renvoi introuvable.**6 below), which shows progress in the recycling of three types of waste, municipal, packaging and electrical/electronic appliances. This raises the question of factors and policy efforts behind such improvements.

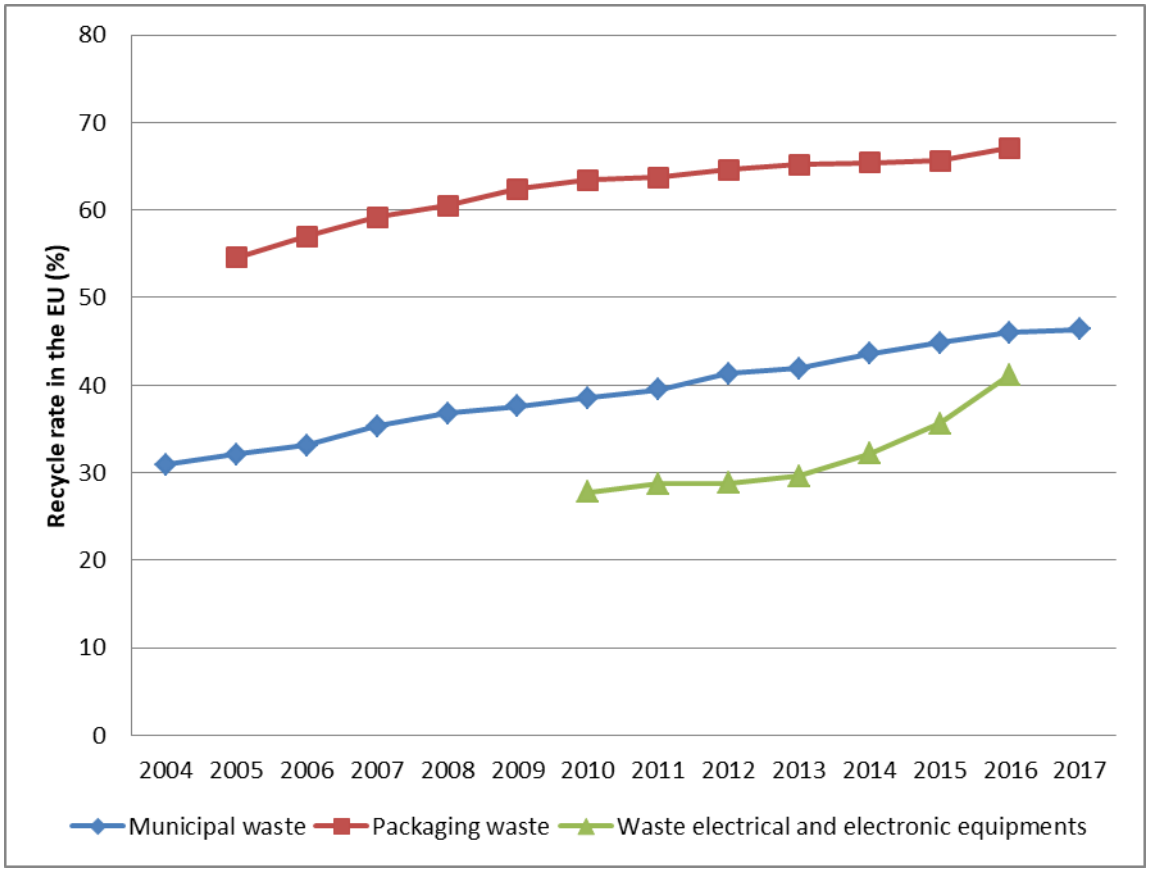

Figure 6: Recycle rate in the EU[78]

1. Development of EU Policies since 2011

Resource Efficient Europe (2011)

In 2011, the European Commission released two documents that laid out a new vision for resource efficiency: "A Resource Efficient Europe – Flagship initiative of the Europe 2020 Strategy"[79] and the "Roadmap to a Resource-Efficient Europe".[80] These documents set the

[77] It was in the 6th Environmental Action Programme that the term of 'resource efficiency' appeared for the first time in the EU.
[78] Reference: https://www.eea.europa.eu/data-and-maps/indicators/waste-recycling-1/assessment-1
[79] Reference: https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2011:0021:FIN:EN:PDF
[80] Reference : https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52011DC0571&from=EN

objective of transforming Europe's economy by decoupling economic growth and resource consumption and "turning waste into a resource". Actions to realise this vision were also outlined, including research and development, market price distortions, governance of waste management, among others. As milestones for 2020, the Roadmap set out to reach an absolute decline in waste per capita and to make recycling and re-use of waste economically attractive, including by:

- stimulating the secondary materials market and demand for recycled materials through economic incentives and developing end-of-waste criteria;
- reviewing existing prevention, re-use, recycling, recovery, and landfill diversion targets to move towards an economy based on re-use and recycling, with residual waste close to zero; and
- assessing the introduction of minimum recycled material rates, durability and re-usability criteria and extensions of producer responsibility for key products, among others.

This 2011 framework was complemented in 2012 by the Manifesto for a Resource-efficient Europe,[81] which called for a circular, resource-efficient and resilient economy, then in 2015 by the first Circular Economy Action Plan, as presented below.

First Circular Economy Action Plan (CEAP, 2015)

The 2015 Action Plan promoted a vision in which 'resources used are kept in the EU economy for as long as possible'[82] to generate new and sustainable competitive advantage for Europe. To realise such a vision, the Plan laid out 54 actions to promote sustainable consumption, waste reduction, and circular economy processes, among other things. The approach taken was, in part, articulated around life-cycle analyses, covering:

- Product design, eco-design (durability, recyclability, etc.), and EPR
- Production processes
- Consumption, including GPP
- Waste management, including EU waste legislation to improve the recycling rate
- Markets for secondary raw materials, quality standards for secondary raw materials (in particular for plastics), and rules on 'end-of-waste' to achieve 'from-waste-to-resources' goals.

Such approaches covered various priority areas, including plastics and marine litter. The 2015 CEAP included a commitment to "adopt a strategy on plastics in the circular economy, addressing issues such as recyclability, biodegradability, the presence of hazardous substances of concern in certain plastics, and marine litter", alongside "a more ambitious target for the recycling of plastic packaging" in the revised legislative proposals on waste. From this commitment emerged the 2018 European Strategy for Plastics in a Circular Economy.

A European Strategy for Plastics in a Circular Economy (2018), "EU 2018 Plastics Strategy"

In line with the priority areas of the first Circular Economy Action Plan, the European 2018 Plastics Strategy lays out a vision for a "smart, innovative and sustainable plastics industry" turned towards the principles of reuse, repair, and recycling. Focusing on plastics production, design, and use, it aims to promote durability, separate collection, and recycling of used plastics; greater integration and innovation in value chains; as well as sustainable alternatives, among others. In order to

[81] Reference: https://ec.europa.eu/commission/presscorner/detail/en/MEMO_12_989
[82] Reference: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52015DC0614

achieve such a vision of a new plastics economy, the strategy also set several targets for EU-level actions, including: [83]

- By 2030, all plastic packaging placed on the EU market is either reusable or can be recycled in a cost-effective manner.
- By 2030, more than half of plastic waste generated in Europe is recycled.
- By 2030, sorting and recycling capacity has increased fourfold since 2015, leading to the creation of 200,000 new jobs across Europe
- By 2025, ten million tonnes of recycled plastics find their way into new products.

The European Commission has since led an assessment report of the voluntary pledges for the target of ten million tonnes of recycled plastics: in 2016, demand for recycled plastics was 3.9 million tonnes and pledges from the demand side accumulated to 6.4 million tonnes, which fell short of the 2025 target. Pledges from the supply side of recycled plastics by 2025 had already reached 11 million tonnes.[84]

Further details on the content of this Strategy are presented in the Appendix III.

In 2019, in response to a request from the EU Council for annual written updates, the Commission conducted an assessment on implementation progress of the 2015 CEAP on the basis of the EU Monitoring Framework for the Circular Economy[85], as presented below.

Report on the implementation of the first Circular Economy Action Plan (2019)

The report noted sound progress across the 54 actions listed in the 2015 CEAP, alongside recorded growth in jobs and businesses relevant to the CE, the establishment of the Circular Plastics Alliance, and greater integration of CE concepts into the broad policy narratives.[86] The report also assessed specific elements of the CEAP, including:

- Circular Design and Production Processes

The report noted that the implementation of the Ecodesign Working Plan 2016-2019, among others, had supported better designs for products covering availability of spare parts, ease of repair, and facilitating end-of-life treatment. This working plan had also encouraged collaboration with the European Standardisation Organisations in order to develop horizontal criteria to measure durability, reusability, reparability, recyclability and the presence of critical raw materials. It was noted that work was also ongoing for improving the design of packaging for re-use and high-quality recycling.

- Turning Waste into Resources

The assessment indicated that the waste legislative framework had been revised and had entered into force in 2018 to include minimum requirements for Extended Producer Responsibility. These covered ‘eco-modulation’, producers’ fees, new targets for recycling rates (55% by 2030), legal status for recycled materials, new obligations on separate collection, strengthened waste prevention and reinforced waste management measures, including for marine litter.

- EU Strategy for Plastics in a Circular Economy

The evaluation also noted an agreement for new rules on Single-Use Plastic (SUP) items and fishing gear, including a ban on the ten SUP products most commonly found on beaches. This

[83] Reference: https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1516265440535&uri=COM:2018:28:FIN
[84] Reference: https://ec.europa.eu/environment/circular-economy/pdf/assessment_voluntary_pledges.PDF
[85] Reference: https://ec.europa.eu/eurostat/web/circular-economy
[86] Reference: https://ec.europa.eu/commission/publications/report-implementation-circular-economy-action-plan-1_en

opened the way for future regulation in this regard, which has since passed as the Directive on the reduction of the impact of certain plastic products on the environment, also known as the 'SUP Directive'.[87]

Building on these existing policy elements, the Commission issued an updated CEAP in March 2020, presented below.

New Circular Economy Action Plan (2020)

Drawing on the former version, the March 2020 CEAP forms an integral part of the EU's "new growth strategy for a fair and prosperous society, with a modern, resource-efficient and competitive economy", i.e. the Green Deal 2019.[88] In response to some of the most pressing environmental issues, the CEAP aims to decouple resource consumption from economic growth, while boosting competitiveness, profitability, and social inclusion. The Plan proposes new policy measures geared towards strengthening sustainable industries, SMEs, services, businesses, and consumption models, with the target that "no waste is produced in the first place". The following plastic-specific actions are laid out in the Plan:[89]

- Encourage sustainable production, through:
  - ✓ Designing sustainable products, given that up to 80% of environmental impacts are determined at the design phase;
  - ✓ Providing consumers and public buyers with cost-saving opportunities through the sustainable product policy framework and the "Right to repair".
- Improving the value chain of key products, including packaging, through:
  - ✓ Designing packaging for re-use and recyclability;
  - ✓ Reducing the complexity of packaging materials;
  - ✓ Ensuring a policy framework that covers sourcing, labelling and use of bio-based plastics, as well as use of biodegradable or compostable plastics.
- Encouraging "less waste, more value", through:
  - ✓ Mandatory requirements in terms of recycled content and waste reduction measures for key products such as packaging, construction materials and vehicles;
  - ✓ EU-wide end-of-waste criteria for certain waste streams. Enhance the role of standardisation.

In late 2020, European Member States during the 17 December Council's meeting reached an agreement to support the 2020 CEAP. The Council's conclusions "provid(e) comprehensive political guidance" to the circular economy and "highlight the role of the circular economy in the recovery from COVID-19 and make a link to digitalisation, underlining its importance for achieving the full potential of the circular economy"[90].

The above package of regulations and measures have been complemented by certain regulations presented below, including the landmark 2019 "SUP Directive".

[87] Reference: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32019L0904&from=EN
[88] Reference: https://ec.europa.eu/info/sites/info/files/european-green-deal-communication_en.pdf
[89] Reference: https://ec.europa.eu/environment/circular-economy/pdf/new_circular_economy_action_plan.pdf
[90] Reference: https://www.consilium.europa.eu/en/press/press-releases/2020/12/17/council-approves-conclusions-on-making-the-recovery-circular-and-green/

2. Related regulations

Amendments to the "Directive on Waste" (2018) and "Directive on Packaging and Packaging Waste" (2018)

These amendments aim to further promote the reduction and recycling of waste and to specify in greater detail the regulations covering Extended Producer Responsibility for plastic packaging. In the Directive on Waste, the concept of "modulation" is also described:[91]

> "In the case of collective fulfilment of extended producer responsibility, obligations are modulated, where possible, for individual products or groups of similar products, notably by taking into account their durability, reparability, re-usability and recyclability".

This modulation is expected to be a strong incentive for producers to adopt sustainable approaches to plastic packaging production for better recyclability.

Waste Electronic and Electrical Equipment (WEEE) Directive (2002)

The first WEEE Directive (Directive 2002/96/EC) entered into force in February 2003. The Directive provided for the creation of collection schemes where consumers return their WEEE free of charge. These schemes aim to increase the recycling and/or re-use of WEEE.[92] The latest amendment came in 2019 to clarify the rules for the calculation, verification and reporting of data and establishing data formats.

Directive on the reduction of the impact of certain plastic products on the environment (SUP Directive) (2019)

As part of the 2018 Plastics Strategy, this 2019 Directive aims to significantly reduce the amount of marine litter from SUPs and fishing gear by 2030. It targets the top 10 single-use plastic products found on beaches and in seas in Europe, as well as fishing gear containing plastic. Under this Directive, the following measures are proposed:[93]

- EPR schemes to cover costs for awareness raising, waste collection and/or cleaning up for certain products such as food containers, cups, plastic bags, wet wipes, balloons, tobacco products and fishing gear.
- Product design requirements for beverage containers' plastic caps and lids, and the following related targets:
  - ✓ PET bottles should be made of at least 25% recycled plastic by 2025,
  - ✓ Beverage bottles should be made of at least 30% recycled plastic by 2030.
- Consumption reduction targets for the SUP products listed (plastic food containers and cups);
- Ban on SUP products, namely cotton bud sticks, cutlery, plates, straws, beverage stirrers, balloon sticks, food and beverage containers, and beverage cups made of expanded polystyrene;
- Ban on oxo-degradable plastic products (see section below);

[91] Reference: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:32018L0851
Reference:https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2018.150.01.0141.01.ENG&toc=OJ:L:2018:150:TOC
[92] Reference: https://ec.europa.eu/environment/waste/weee/index_en.htm
[93] Reference: https://eur-lex.europa.eu/eli/dir/2019/904/oj

- Separate collection for recycling of 90% of single-use plastic products by 2029 (77% by 2025) through deposit-refund or EPR schemes;
- Marking requirements for sanitary towels, tampons and tampon applicators, wet wipes, tobacco products with filters and cups for beverages; as well as
- Awareness-raising measures.

Directive on Port Reception Facilities (2019)

Another important directive is the Directive on Port Reception Facilities (2019), which was also adopted as part of the EU Strategy for Plastics in a Circular Economy. Through this Directive, the EU aims to reduce all waste discharged from ships into the ocean (including fishing vessels) and maximise waste delivery to port reception facilities. Like cost recovery systems, no direct fee will be charged to fishery operators for the delivery of MARPOL Annex V waste[94], irrespective of the volume of waste delivered to a port reception facility under the Directive. Under this system, ships are expected to take greater responsibility for waste delivery, including fishing gear and passively fished waste, without further additional fees.

In terms of fishing gear, the EU is seeking to take a comprehensive approach through the two Directives, as well as introducing Extended Producer Responsibility schemes for producers of fishing and aquaculture gear containing plastic, so as to cover the costs of separate collection, transport and treatment under the SUP Directive. Financial incentives are also to be provided for the delivery of waste fishing gear by ships under the Directive on Port Reception Facilities. This comprehensive approach is expected to ensure full coverage of fishing gear in waste management and recycling systems.[95, 96]

Restrictions on microplastics (ongoing)

In 2018, the European Commission tasked the ECHA (European Chemicals Agency) with preparing a proposal for the restriction of intentionally added microplastics in the framework of the REACH regulations. This was done in the wider context of the EU Plastics Strategy.

In June 2020, ECHA's Committee for Risk Assessment (RAC) adopted its opinion on ECHA's proposal to restrict the use of microplastics that are intentionally added to products on the EU/EEA market, in concentrations of more than 0.01 % weight by weight. The committee recommended the following specific technical elements, covering:[97]

- The definition of "a microplastic": ECHA proposed a lower size limit of 100 nanometres for a microplastic, as analytical methods for detecting microplastics in products (i.e. mixtures) are still in development.
- Biodegradable polymers: ECHA's proposal set out specific test methods and pass criteria for identifying biodegradable polymers, which are excluded from the restriction.

[94] "*Under MARPOL Annex V, garbage includes all kinds of food, domestic and operational waste, all plastics, cargo residues, incinerator ashes, cooking oil, fishing gear, and animal carcasses generated during the normal operation of the ship and liable to be disposed of continuously or periodically. Garbage does not include fresh fish and parts thereof generated as a result of fishing activities undertaken during the voyage, or as a result of aquaculture activities*." (Further information is available at: https://www.imo.org/en/OurWork/Environment/Pages/Garbage-Default.aspx#:~:text=Under%20MARPOL%20Annex%20V%2C%20garbage,disposed%20of%20continuously%20or%20periodically.)

[95] G20 Marine Plastic Litter Portal site - EU country page, https://g20mpl.org/partners/europeanunion

[96] Reference: https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1570190453030&uri=CELEX:32019L0883

[97] Reference: https://echa.europa.eu/-/rac-backs-restricting-intentional-uses-of-microplastics

- The use of microplastics as infill material on artificial turf pitches: ECHA's RAC recommended a complete ban after a transition period of six years, as there was incomplete information on the effectiveness of risk management measures.

In addition to this set of Directives, other governmental and non-governmental initiatives are also underway with the shared objective of advancing the plastics issues. These initiatives are presented below.

3. Related initiatives

European Circular Economy Stakeholders Platform

As an online platform for information and knowledge sharing on the circular economy, a joint initiative called the "European Circular Economy Stakeholders Platform" was launched in March 2017 by the European Commission and the European Economic and Social Committee. Stakeholders participating in the online platform are able to share knowledge and experiences, including good practices, strategies, and related studies on circular economy issues, through either direct or indirect submission to the platform. The platform's database is expected to encourage mutual learning between stakeholders and explore opportunities for collaboration.[98]

Circular Economy Finance Support Platform

In order to boost investments in favour of a circular economy, the "Circular Economy Finance Support Platform" was established in January 2017 by the Commission and the European Investment Bank (EIB). This platform comprises key stakeholders including national development banks, private financial institutions, NGOs and trade associations in Europe. Its purpose is to attract public and private investment and apply existing tools such as the European Fund for Strategic Investments (EFSI) to circular economy projects. It is also expected to identify circular economy needs and further opportunities, as well as support required for improving projects' bankability.

Circular Plastics Alliance

The Circular Plastics Alliance was founded in 2018 as a platform bringing together the public and private actors that are committed to the Alliance's declaration and goal: boost the EU market for recycled plastics to 10 million tonnes by 2025. The alliance covers the entire plastics value chain and includes over 175 organisations representing industry, academia, and public authorities. To date, 245 signatories have signed up to the declaration, which is supported by a work plan issued in March 2020 laying out actions to achieve the above-mentioned target.[99, 100]

Plastics Recyclers Europe

Plastics Recyclers Europe (PRE) is an organisation representing the voice of European plastics recyclers who reprocess plastic waste into high-quality material destined for the production of new articles. Its members include 90 recycling companies, 25 related "friend" companies, and 7 associations. The organisation provides practical standard documents such as "Recycling input characterisation guiding requirement". It also created the "RecyClass" website with the aim of

[98] European Circular Economy Stakeholders Platform, https://circulareconomy.europa.eu/platform/en
[99] Reference: https://ec.europa.eu/growth/industry/policy/circular-plastics-alliance_en
[100] Reference: 'Design for Recycling workplan' https://ec.europa.eu/docsroom/documents/43688

helping brand owners and converters to improve the design of their plastic packaging, and issued "Design for recycling guidelines" for plastic packaging.[101]

EuCertPlast

Developed via a three-year project, co-financed by the European Commission under the Eco-Innovation Programme, the EuCertPlast initiative aims to encourage environmentally-friendly plastics recycling processes through standardisation. The scheme focuses on the traceability of plastic materials (throughout the entire recycling process and supply chain), and on the quality of recycled content in the end product. In this regard, it provides a certification system for plastic recyclers. As of May 2020, 184 recyclers, mostly in Europe and some in Asia, are certified.[102]

European Plastic Converters

Created in 1989 and based in Brussels, EuPC is the EU-level trade association of European plastics converters. It has four divisions, Packaging, Building and Construction, Automotive and Transport, as well as Technical Parts, accounting for the different markets of the plastic converting industry. Today, EuPC represents 28 national associations and 18 sectoral organisations, forming a powerful voice for the European plastics converters industry.[103]

I4R-Platform

In compliance with the requirements of the WEEE Directive, the I4R platform provides information on the preparation for re-use and treatment for each type of EEE placed on the market. Through the website, manufacturers can share information on each product, report it in a harmonised format, and share it publicly, including with recyclers who need access to such recycling information, detailed at a product category level.

Alliance to End Plastic Waste (AEPW)

The Alliance to End Plastic Waste (AEPW) is made up of nearly 30 major global companies, launched in 2019. They have committed over USD1 billion (approximately EUR 1.15 billion) with the goal of investing USD1.5 billion (EUR 1.7 billion) over the next five years to develop, deploy and bring to scale solutions that will minimise and manage plastic waste and promote post-use solutions.[104] The alliance is not limited to European companies; it also includes Japanese and American firms. Japanese companies such as Mitsubishi Chemical, Sumitomo Chemical, and Mitsui Chemicals are key members of the alliance.[105]

Funding programmes

The European Investment Bank (EIB) offers financial support to encourage the transition to a circular economy, with EUR 2.5 billion provided to the co-financing of circular economy projects, from 2014 to 2019.[106] The EIB also provides advisory support, and in May 2020 released a technical guide on how to identify circular economy needs, opportunities and risks.[107]

Other EU funding programmes related to the circular economy and plastics include the "European Structural and Investment Funds" and the "LIFE programme". In 2019, a new initiative called

[101] Reference: https://www.plasticsrecyclers.eu/ https://circulareconomy.europa.eu/platform/en/commitments/pledges/plastics-recyclers-europe https://recyclass.eu/recyclass/design-for-recycling-guidelines/
[102] Reference: https://www.eucertplast.eu/
[103] Reference: https://www.plasticsconverters.eu/ https://circulareconomy.europa.eu/platform/en/commitments/pledges/european-plastics-converters-aisbl
[104] Reference: https://www.basf.com/global/en/who-we-are/sustainability/we-produce-safely-and-efficiently/resources-and-ecosystems/engagement-against-plastic-waste/Alliance-to-end-plastic-waste.html
[105] Reference: https://endplasticwaste.org/
[106] Reference: https://www.eib.org/attachments/thematic/circular_economy_overview_2020_en.pdf
[107] Reference: https://www.eib.org/en/publications/the-eib-in-the-circular-economy-guide https://www.eib.org/attachments/thematic/circular_economy_overview_2020_en.pdf

"Plastics Circularity Multiplier"[108] was formed in order to improve value chain collaboration, to create cooperation, and to enhance the impact of Horizon 2020 projects geared towards a circular economy for plastics. The aim of the Multiplier is to develop a pool of resources and expertise, disseminate key messages, and communicate to policymakers, the public, and industry on EU-funded innovations in the area of plastics.[109]

4. Findings from EU policy and stakeholder analysis

The EU has developed and implemented several advanced policies and interesting initiatives focusing on resource efficiency and the circular economy. To tackle urgent plastic issues, the EU has adopted a comprehensive approach through binding policies, ranging from marine plastic measures to eco-design policies under an ambitious circular vision for a radical transformation of the economy. Below are some of the salient features of the EU policies, relevant to Japan's. Details are discussed in chapter 4.

- Both the EU and Japan started to address the circular economy or 3Rs for waste management in around the year 2000. While the EU's recycling rate has progressed, its waste consumption trend has not. In Japan, the situation is the other way around.
- The EU has developed an integrated Circular Economy Action Plan (CEAP) policy, which covers both the production and waste management sides and different product categories, including plastics in various sectors.
- Since 2015, eco-design has been the focus of the first and second CEAPs. The concept of eco-design includes durability, reparability, recyclability, among others. For the plastics issue, improving recyclability is one of the key points of eco-design. However, a concrete direction for recyclability still seems to be under consideration and has not yet been formalised in the EU.[110]
- The 2018 European Strategy for Plastics in a Circular Economy sets numerical targets for plastic recycling. One of the focuses is to stimulate the secondary plastics market. Monitoring to achieve targets is underway. Mandatory contents of secondary plastics in the New CEAP (2020) are expected to contribute to increasing their use.
- EPR is an important policy tool to promote recycling, especially for plastic packaging because the market value of secondary plastic is generally low. The "modulation" concept for Extended Producer Responsibility is expected to work as a strong incentive for producers to improve the recyclability of packaging.
- EU industries have developed new technologies for plastic waste separation and secondary plastic processing. For example, advanced optical separators for waste separation are mostly made in European countries and imported to Japan in large numbers. Recently, processing machineries for secondary plastics were also provided by European countries to waste management facilities.
- In the EU, it is the recycling associations themselves that have issued standard guidelines for recycling materials and eco-design. In contrast, in Japan, eco-design guidelines are issued by manufacturing organisations in limited production categories. . It is apparent that Japanese recycling industry has not issue such a standard. To enhance recycling activities in Japan especially for plastics among different production

[108] Plastics Circularity Multiplier, https://www.plasticscircularitymultiplier.eu/
[109] G20 Marine Plastic Litter Portal site - EU country page, https://g20mpl.org/partners/europeanunion
[110] Reference: https://ec.europa.eu/energy/topics/energy-efficiency/energy-label-and-ecodesign/regulation-laying-down-ecodesign-requirements-1-october-2019_en

categories, waste management sector should more proactive for standardisation. It would be useful to see how the standard guidelines of recycling associations in the EU actually work.

Chapter 3 – key insights

The above review of EU policies and initiatives shed light on some areas where information sharing between the EU and Japan would be beneficial to all, namely:

- How is the development of a secondary plastics market in Europe being supported? What are the underpinning market mechanisms, including pricing, in such secondary plastics markets?
- How are plastic recycling business associations working to establish the market and standards? Are the current standards working well?
- How will mandatory contents of secondary plastics be regulated?
- How will modulation of Extended Producer Responsibility be incorporated into practices?

Chapter 4: Comparative policy analysis on circular economy and plastics resource circulation

1. Comparison between EU and Japanese policies for plastic resource circulation

Having presented a general picture of EU and Japanese circular economy policies and initiatives in the previous sections, this chapter takes a closer look at the following select policies:

- Japan's Resource Circulation Strategy For Plastics (2019)
- A European Strategy for Plastics in a Circular Economy (2018)
- The EU's New Circular Economy Action Plan (2020)

These landmark policies offer a rich scope of measures. Among these, the following ones are of particular interest when comparing and contrasting EU and Japanese policies:

(1) Reduction of waste through bans on single-use plastics and eco-design;

(2) Eco-design, recyclability, and markets for secondary plastics materials;

(3) Bio-plastics and other sustainable alternatives to petrochemical plastics.

These policies offer a precious prism through which they can be studied, for the following reasons. First and foremost, reduction of use remains a top priority for tackling plastic litter. It is the first "R" of the Japanese 3Rs approach and the bedrock of the EU's narrative. Second, the successful transition to a circular economy hinges upon the development of a mature, well-functioning market for secondary plastics materials. Overcoming the numerous health, economic, technological and cultural barriers is essential for the effective recycling of used plastics and the full valorisation of recycled material, for both the EU and Japan. Third, sustainable alternatives to fossil-fuel plastics. This is an issue of growing importance in tackling the all-pervasive common plastics. While "bio-plastics" are seen by some as a viable solution, others have a more cautious take on them. Such differences in opinions and approaches call for careful consideration as various countries, businesses, industries, and consumers start to shift towards such options. Finally, while reducing, recycling, and replacing plastics with sustainable alternatives are foundational policies, there are a whole host of other problems and potential policy solutions that remain central to effectively tackling the challenge at hand, including MPL, microplastics, international collaboration, etc., where the EU and Japan can learn from each other. These are covered throughout the chapter and not as a stand-alone section.

Before diving into the specifics, the following tables present some of the salient differences in policy approaches and regulations between the EU and Japan, with respect to the first three policies listed above.

Table 4: Comparison of policy approaches to plastics in Japan and the EU[111]

<table>
<tr><th></th><th>Reduction of waste</th><th>Creating a market for secondary plastics materials</th><th>Bio-plastics and other sustainable alternatives to petrochemical plastics</th></tr>
<tr><td>Japan</td><td>Reduction measures consist of reducing single-use plastic through weight saving and reuse.

No mention of increasing the usage of recycled plastic nor eco-design for recyclability.</td><td>A secondary plastics market requires an efficient recycling system, which includes thermal recovery and chemical recycling.

Recycling is considered mainly as a waste management issue. Improved recyclability of packages and products is merely mentioned.</td><td>Biomass and biodegradable plastics, and alternatives such as paper, are promoted and backed by quantitative targets by 2030.</td></tr>
<tr><td rowspan="2">EU</td><td colspan="2">Eco-design is paramount for achieving effective plastic resource circulation (i.e. reduction, reuse, repair and recycling).</td><td rowspan="2">Biomass and biodegradable plastics are still under evaluation and consideration.</td></tr>
<tr><td>The use of secondary plastic materials in products is strongly promoted, and backed by quantitative targets by 2035.

Particular focus is placed on improving the durability, reparability, and recyclability to extend the life of used plastics.</td><td>Changes in production and design are encouraged, as they are expected to enable higher plastics recycling rates.</td></tr>
</table>

Table 5 also presents some differences in regulations specific to plastic materials and recent bans in the EU.

Table 5: Comparison of select regulations to restrict specific plastics

	Japan	EU
Single-use plastics	Measures include a mandatory charge for plastic shopping bags were introduced in 2020, with the following exemptions (see Box 3):	Consumption reduction targets for identified single-use plastic products are set in the SUP Directive (see Chapter 3-2).

[111] Table 4 is an extract from the Appendix "Summary table of Japan/EU policies on circular economy and plastics". Please see the Appendix I to IV for further details.

	• Reusable bags made with thick plastic of more than 50 micrometers. • 100% marine biodegradable certified plastic bags. • Plastic bags made of 25% or more bio-based plastic (this percentage will be raised in the future). Reduction of plastic straws is encouraged through voluntary actions, mainly driven by the business sector.	Bans on selected single-use products made of plastic for which alternatives are available on the market, exist. These products include: cotton bud sticks, cutlery, plates, straws, stirrers, sticks for balloons, food and beverage containers, and beverage cups made of expanded polystyrene (2019). Restrictions on shopping bags are managed by each country.
Oxo-degradable plastic	(No regulation in Japan because it is not very common.) The Japan BioPlastics Association (JBPA) does not certify oxo-degradable plastics as biodegradable.	Ban on all products with oxo-degradable plastics.
Microplastics	The Japan Cosmetic Industry Association announced a voluntary ban on microplastics in cosmetics in 2016. The Act on Treating Articles that Drift Ashore is amended to reduce microplastics in the sea, but no obligation (2018) (see chapter 2-2).	Restrictions on intentional additions of microplastics have been proposed by the ECHA (European Chemicals Agency) (see chapter 3-2).

The above tables present an overview of some of the notable differences separating the EU and Japan. With these in mind, the next section looks at the foundational EU and Japan policies of plastic waste reduction, focusing first on SUPs, second on eco-design to reduce waste.

2. Reduction of waste

Single-use plastics

Both Japan and the EU have implemented actions targeting single-use plastics to reduce plastic waste; however, their targets and methods are different, as seen in Table 5 above.

In Japan, the most recent development has been the introduction of a mandatory charge for SUP bags in July 2020, i.e. a stand-alone policy. While other Japanese legislation provides measures for SUPs, it does not cover an extensive scope of products. This 2020 mandatory charge covers plastic bags solely, which account for only a small percentage of the 9 million tons of annual plastic waste. Loopholes in the charge may also emerge, as the legislation does not cover plastic

bags with a thickness of 0.05 millimetres or greater that can be repeatedly used, nor biomass plastic bags with at least 25 percent of the content derived from plants.[112]

In the EU, in contrast, the 2019 legislative framework of the SUP Directive lays out a broad suite of policy measures aimed at cutting back drastically on SUPs, and banning some. As it is remarkably wide-ranging, Japan could learn from the EU's experience and consider regulating a wider range of SUPs and also narrowing the scope of its current mandatory charge to limit potential loopholes.

Thus, future discussions could address the points in the discussion box below.

Single-use plastics – issues for consideration

- What lessons can be drawn from the application of current waste reduction policies in place so far? Which applications should be covered by SUP bans or restrictions?
- What are the current monitoring tools being used, and what are the related challenges?
- What progress in policy implementation has been achieved, and what are the outlooks for the years to come?

Eco-design for reducing waste and improving durability, reusability, reparability, and recyclability

Although "eco-design" may refer to a number of environmental goals and products (e.g. eco-design labels for energy-efficient home appliances), here it relates to product designs that contribute to reducing waste and to improving the durability, reusability, reparability, and recyclability of plastic materials. Eco-design is not limited to physical products however, and can be also applied to services, systems, and business models.

As seen in table 4, eco-design is central to the EU's approach to reducing waste and increasing the durability, reusability, reparability, and recyclability of waste. The concept is less prevalent in Japan, however. Below are some of following notable differences between the two economies:

- In the EU's various policy strategies, the main products targeted by eco-design for waste reduction include packaging and electronic products. For electronic products, the focus of eco-design is to improve durability, reparability and recyclability. However, a concrete direction for the goal of 'recyclability', such as a clear definition and standards for recyclability, still seems to be under consideration, and has not yet been fully formalised. Indeed, the standard covering the recyclability of plastics is issued by the plastic recycling industry, which could potentially lead to biased requirements for recyclability. Lastly, the use of more secondary plastics is considered essential to reducing total consumption of plastics. (The last point is also discussed in the next section.)
- In Japan's Plastic Strategy, eco-design applied to waste reduction mainly involves weight saving measures and promoting reuse of plastics. There are several good eco-design practices for recyclability, such as those for home appliances or PET bottles, for instance. In particular, production industry associations have issued eco-design standards for PET bottles, which help contribute to improved recyclability. A design standard developed by

[112] The Asahi Shimbun, '*Not everyone on board with plan to charge fees for plastic bags*', http://www.asahi.com/ajw/articles/13485421 (Accessed: July 12, 2020)

the beverage industry for improving recyclability has led to a high recycling rate (84.6% in FY 2018), and has also encouraged bottle-to-bottle recycling. However, these good practices are implemented on a sector-by-sector basis, and barely feature in the national Strategy.

Furthermore, eco-design considerations in the Japanese packaging and container recycling sectors are less prevalent. Indeed, in these sectors, waste is collected by municipalities and transferred to waste management companies. As such, packaging and container producers only pay for the treatment of the waste under the dedicated EPR system. They do not recycle the products themselves, and therefore do not need to deal with recyclability nor eco-design, for which they have little incentive to do more. In addition to this, the Japanese packaging and container industry is developing an increasing number of new materials in response to demands from other industries (for example, to maintain the freshness of food or to offer consumers more attractive designs). More and more complex materials are being placed on the market, which is making recycling increasingly difficult.

Despite such contrasting situations in Japan and the EU, eco-design remains a major issue to increase the recyclability of plastics. Indeed, a major and difficult challenge impeding recyclability is separating used products into single materials. Many packaging items and products are made from complex materials comprising different kinds of plastics and/or plastic and other materials. A number of plastics also contain various additives. Solutions to these barriers could, and should, come in part from eco-design. The development of an open standard for eco-design could be one of these solutions. Such standards could facilitate the eco-design labels and practices that facilitate the decomposition and separate collection of products, in particular mono-material ones. Eco-labels could help the separate collection, sorting, handling and recycling of products, and act as guarantees of quality for secondary materials. Standards setting is be best done through multi-stakeholder discussions involving producers, retailers, waste collectors, separators, processers and users of secondary materials, in order to establish a common understanding of recyclability concepts and to overcome technical difficulties.

Such approaches have proven their success in Japan, where the beverage industry has collectively developed an eco-design standard to improve the recyclability of PET bottles. As a result, PET bottle recycling in Japan has reach high recycling rates, i.e. 84.6% in FY 2018, and is of high quality, making bottle-to-bottle recycling possible.

Equally importantly, EPR schemes could also be applied as a policy tool to advance eco-design. As already mentioned, the idea behind EPRs is that the producer is made responsible for the environmental burden of its products throughout the entire life-cycle, i.e. not only during production but also during utilisation and disposal. This concept is incorporated into various policy tools for the circular economy in the EU and 3R in Japan (see chapters 2 and 3). Recently, the concept of “modulation” of EPRs has been proposed in the EU as an incentive for producers to improve the recyclability of packaging. This concept has not appeared in Japanese policy yet. Thus, it would be valuable to share insights into EPR modulation and eco-design policies, as suggested in the topics for consideration below.

Eco-design – issues for consideration

- How to promote eco-design for a more circular economy? Who is responsible, and for what?
- What kind of incentives could encourage manufacturers to adopt eco-design practices more systematically? What role, if any, could recyclers play in persuading manufacturers to promote eco-design? Could large retail chains have an influence on producers and consumers when it comes to selecting eco-friendly products? Could consumers, through greater awareness and behaviour change, encourage more eco-design?
- What kind of open standards would be useful for advancing eco-design?
- The concept of eco-design could be applied not only to the product itself, but also to the system as a whole. What kind of "eco-design systems" could contribute to reducing plastic consumption and waste?
- With the emergence of IT-based sharing services, such as car or room sharing, new opportunities for efficiencies and sustainable practices are possible. However, these services may also increase demand for and consumption of products, including plastics. How could this be overcome to allow for an "eco-designed system" to emerge?
- With regard to best practice sharing, eco-design has been at the centre of EU policies since the 2015 CEAP. Thus, it could be useful to exchange more information about policy impact, implementation issues, good practices, as well as outstanding challenges relating to eco-design. One topic could be eco-design for electronics products which are also covered in EU policies, in addition to packaging and single-use plastics, but not extensively in Japanese policy.
- In relation to business best practices, there are several examples of eco-design practices in Japan, but they are not fully incorporated into national policy, nor adopted across sectors. Which methods could be used to promote more information-sharing, and open discussions across sectors and stakeholders?
- How can EPR schemes, and now EPR modulation, be leveraged to stimulate eco-design?

3. Creating national and international markets for secondary plastics materials

At a domestic level

The above section focused on the importance of eco-design in reducing waste and increasing durability, reuse, and recyclability. Eco-design is indeed essential to creating a market for secondary plastics materials. Secondary raw materials are generally materials that have been recycled from waste and used as a raw material to produce a new product. Some secondary raw materials are derived from industrial process waste, and others are recovered from post-consumer waste.

Both the EU and Japan have recognised the importance of, as well as the challenges inherent to the emergence of a mature recycling and secondary raw material markets, and achieving circular economy objectives.

This is highlighted in the following Japanese and EU policies and business initiatives, noting, however, differences in overall deployment of eco-design and recycling practices between the two economies.

- In Japan:
  - ✓ The Japanese Resource Circulation Strategy for Plastics includes a section on improving the recyclability of packaging and products. It sets a milestone of 60% of plastic containers and packaging to be reused or recycled by 2030. Concrete measures are now under discussion by the MOEJ and METI joint working group (see chapter 2).
  - ✓ Some home appliances manufacturers also stress their efforts to utilize recycled plastics (see Box 4), noting that eco-design of home appliances has also been promoted since the Act on the Recycling of Specified Kinds of Home Appliances have been enforced.
  - ✓ In contrast, for ELVs many parts are already recycled within the recycling market. Eco-design for recyclability, especially for plastic, has not been an outstanding topic for ELVs. The automotive industry is also considering an incentive system to utilize more recycled plastic in new vehicles. However, this consideration seems to target only plastics that are derived from ELVs and don't include other plastics from industrial and municipal waste.

This trend, in addition to the way the EPR scheme functions, seem to explain why eco-design is not making much progress in Japan.

- In the EU:
  - ✓ The 2019 European Strategy for Plastics sets out eco-design requirements and a target to put 10 million tonnes per year of recycled plastics into new products by 2025.
  - ✓ In the 2020 CEAP, the concept of mandatory content of secondary plastics is proposed, requiring that the products in question must contain a certain amount of secondary plastic. Though the concept has not been announced as a concrete regulation, it is expected to stimulate the plastic recycling market and also mitigate the economic disadvantage of secondary plastics. This concept has not appeared in Japanese policy.
  - ✓ European businesses, research and other organisations are also developing new technologies for waste separation and processing of secondary plastic materials, which can facilitate penetration of eco-design and recycling practices.
  - ✓ Recyclers' associations are also key contributors to eco-design deployment in the EU, as they issue guidelines for recycling materials and eco-design. Examples of these include "Recycling input characterisation guiding requirement", published by the Plastics Recyclers Europe association and "Design for recycling guidelines"[113]

[113] RecyClass have developed a wide-range of other resources and guidelines geared towards greater recyclability and traceability, such as the 'Recyclability Methodology', the 'Recyclability Evaluation Protocols', the RecyClass online tool, and recyclability certifications and technology/product approvals. Reference: https://recyclass.eu/

for plastic packaging issued by the industry platform 'RecyClass' bringing together recyclers, raw material producers, retailers and brands (see Chapter 3-5).

At first glance, it could be said that eco-design for increased recyclability of plastics has made stronger headway in the EU. However, this does not take into account the many other challenges (economic, industrial, behavioural, information, infrastructure, etc.) that hinder the emergence of a fully-fledged, well-functioning market for secondary raw materials.

Indeed, various ingredients need to be in place for a secondary raw materials market to develop in both countries, including among others: 1) high-quality and economic competitiveness of recycled materials; 2) alignment with health, food safety, and other requirements; and 3) effective systems for the separate collection of waste.

First, on the expected quality and affordability of recycled plastics. Materials such as steel, aluminium and paper are quite easy to recover from post-consumer waste via separate collection or waste management processes and then to recycle as secondary raw materials. Over the history of recycling, the quality of these secondary raw materials has long been established. These secondary raw materials are also sufficiently economically competitive with virgin materials, i.e. their prices are generally lower than those of virgin materials.

Regarding plastics, however, post-consumer waste is more difficult to recycle as secondary raw materials than industrial waste, because it is a mixture of various kinds of different plastics, contaminated plastics and other waste. One of the key topics of this report is how to extend the recycling of post-consumer plastic waste. The cost of secondary plastic is often higher than that of virgin plastic, as the cost of producing the latter is closely linked to fossil fuel prices, making it far more profitable than recycling when oil prices are low. Until the negative externalities associated with plastic consumption and pollution are effectively accounted for, new, cheap, and practical plastics will continue to lower the competitiveness and appeal of recycled plastics. Thus, life-cycle assessments on CO_2 emissions should also be led to compare virgin and recycled plastics.

With regard to questions of quality, the challenges are manifold (e.g. lower-grade, colouration, presence of additives, impurities, polymer cross contamination, etc.), and in part linked to the increasing complexity of the composition of plastics (e.g. multi-material, coloured, several barrier layers, etc.). As plastics have become more and more sophisticated, their recycling has become more and more complicated. Despite technological progress (e.g. chemical recycling), recycling remains largely mechanical to date, which implies certain quality limitations as mentioned above.

In this regard, the recycling industry could provide greater leadership in defining, maintaining, requiring and guaranteeing the overall quality criteria for secondary plastics. The sector could help develop standards governing secondary plastics (see point above on an open standard for eco-labels), and lay out requirements for, or provide guidance to, other manufacturers and industries for enhanced recyclability of their products.

Second, on the necessity to consider and deal with health, food safety, and other regulations, which constitutes another important barrier to the deployment of secondary raw materials. Trade-offs between policies can impede recycling, as many plastics need to be 'food-grade', meaning suitable for contact with consumable food or drink products. Such requirements imply specific product characteristics, which often complicate their recycling. Thus, policymakers need to find ways to deal adequately with such diverging, or contradictory, policy objectives, and ensure an overall alignment among policies.

Third, on the importance of having a well-functioning separate collection system. Indeed, in order to recycle materials from waste, it is necessary to separate the waste into each individual material. Separate collection of waste is widely implemented both in Japan and the EU. For example, in Japan, household waste is separated into each recyclable by each household. This system covers paper, steel cans, aluminium cans, PET bottles, other plastics, glass, fibre and non-recyclable wastes to burn, in accordance with each municipality's regulation. Separate collection makes recycling easier, but the cost of collection and treatment of municipal waste rests with municipalities, which are funded by taxpayer money. Inappropriate consumer behaviours when discarding waste also impedes the efficiency of collection systems, alongside the already mentioned challenges with 'polluted food plastics', or bio-degradable plastics which require specific conditions for proper decomposition, which are often not respected.

Key actors, such as large retailer chains, could also provide the space and facilities necessary for the collection of the various types of used plastic, and importantly its aggregation into larger volumes of waste. Reaching such volumes and economies of scale is necessary for the emergence of a mature secondary market for plastics. In Japan for example, large retail chains already have collection points for recyclables such as PET bottles, milk cartons, and polystyrene food trays. If large retail chains were motivated to have more collection points in their stores, they would also be motivated to have more easily recyclable products on sale, which would be a strong incentive for them to choose and display more recycling-friendly products and packaging. However, this would also necessitate a suitable amendment of the Waste Management and Public Cleansing Act, which currently requires a licence for waste collection and transportation that retailers are not yet entitled to have.

Finally, advanced IT (information technology) solutions could also offer new tools to facilitate the reuse, return, repair, recycling or shared use of goods and services, and in doing so help avoid the unnecessary consumption of single-use items and thus alleviate the recycling system.

In sum, the above issues seem relevant topics when discussing the emergence of an EU-Japan bilateral market for secondary plastics. Taking it one level higher, the next section looks at underlying issues to the development of an international one.

At a bilateral or international level

In order for an EU-Japan market for secondary plastics to develop, it is essential to have common standards for secondary plastics in place to support trade. These are essential to ensure that quality, health and other requirements are effectively met and to see a fluid, mature trade develop, at least at bilateral level. To date, trade between Japan, the EU and other countries is regulated by the Basel Convention, with the exception of some secondary materials which are not governed by it.

When China banned its imports of plastic waste in 2018, Japan, the EU and other countries saw their exports to China of certain plastic waste, as a secondary material, affected. This prompted an amendment of the Basel Convention in 2019, whereby certain kinds of waste plastic would be governed by the convention from 2021 onwards. It also forced a number of countries to rethink their approach to plastic waste management.

To date, there is an extensive set of ISO (International Organization for Standardization) and JIS (Japanese Industrial Standards) standards for plastic recycling. As shown in Appendix V, ISO determines several standards for recycling plastics. Some of them have been incorporated into JIS. However, the most basic standards, ISO 15270 and JIS Q 9091, do not match each other,

which is an issue that must be addressed to ensure compatibility and the effective use of standards. In addition, there are at least 11 different JIS standards for individual products made of recycled plastic, which adds even further complexity in aligning them.

Drafting and abiding by such common standards can be a strenuous undertaking for the countries involved. While Japan and the EU's appetite for such an undertaking is yet to be defined, the potential benefits of shared standards offer matter for careful consideration. It is therefore against this backdrop that an EU-Japan market for recycled plastics is yet to emerge, based on a common international standard for secondary plastic materials that would be useful to promote recycling.

Drawing from the above discussion on a market for recycled plastics, the following issues could be considered as mutual topics of interest for EU-Japan exchanges.

Creating a market for secondary plastics materials – issues for consideration

- How to mitigate the economic disadvantages of recycled materials? How to make secondary plastics profitable?
- What are the technical barriers to the mandatory requirement of recycled plastic content?
- How to address the trade-offs between highly functional plastic (food-grade for example) and recyclability?
- How should a separate collection system be used to obtain high-quality recycled materials?
- How could the collection of recyclables be enhanced at large retail chain stores in terms of volume and greater variety of materials?
- What kind of tools are effective to promote recycling across different products and different business sectors?
- How could recyclers associations help to boost the market for secondary materials?
- How could an open standard for the quality of secondary plastic materials be developed?
- Could the "mandatory content of secondary plastic" rule in the EU become a barrier to imports from other regions?
- How can the EU and Japan work together towards the emergence of standards that allow bilateral, or international, trade?
- Even if a product was made from recycled material, the product still might be single use. Little policy attention has been given to this point. How can this issue be addressed?

4. Bio-plastics and other sustainable alternatives to petrochemical plastics

Further to waste reduction and recycling, another policy area of importance are 'bio-plastics'. For some, they are a promising solution to address rising fossil fuel consumption and pollution, while for others they are a source of concern, or at least caution. Having provided a definition of the the different types of 'bio-plastics' (see chapter 2), the EU and Japanese positions on this issue is outlined below.

Definition of bio-plastics

The term 'bio-plastics' encompasses two broad concepts (modified from Plastics Europe, 2016[114]:

- Biodegradable plastics (also called "green plastic" in Japan) are materials that can be broken down by microorganisms to form water and carbon dioxide (in aerobic conditions), or water and methane (in anaerobic conditions). They can be produced from either biogenic or fossil carbon sources.
- Bio-based plastics (also called "biomass plastic" in Japan) are made from biological, plant-based sources such as sugarcane, beet sugar, corn, potatoes, grain or vegetable oils. These plastics are not necessarily biodegradable. Only certain bio-based plastics can also be classified as biodegradable plastics.

Bio-plastics and alternatives in Japan

In Japan, the JBPA issues standards for both biodegradable and bio-based plastics. Such standards are displayed on products to guide consumers, and they are given if the following requirements are met: [115]

- For biodegradable plastics, all components must be included on a "positive list"[116] of non-harmful elements, and non-biodegradable components must account for less than 5% of total weight, in order to qualify for the JBPA's 'GreenPla' standard.

As a result, more than 95% of total weight must be able to biodegrade into carbon dioxide and water within six months. This means that oxo-degradable plastics cannot be certified under this standard, given the residual additives they contain that cannot be fully decomposed into carbon dioxide and water.

The plastics submitted for certification are tested in aerobic conditions of degradation, with oxygen, water, soil and composting environments. Anaerobic conditions of degradation for such plastics are not tested. Specific certifications for "compostable plastics" are also available.

Marine environment degradable certification is not yet available by JBPA. So far, companies such as Kaneka have obtained certification from overseas test institutes.

- For bio-based plastics, under JBPA's 'BiomassPla' standard, a minimum of 25% of biomass components must be included on a "positive list" in order to qualify for the JBPA's 'BiomassPla' standard. The standard also prohibits certain substances[117] which are harmful to the environment.

[114] Reference: https://www.plasticseurope.org/application/files/4315/1310/4805/plastic-the-fact-2016.pdf
[115] Reference: http://www.jbpaweb.net/english/
[116] This positive list is a highly technical assessment, which helps guide the evaluation of the products presented. It is presented in greater detail on the JBPA website.
[117] The full list of harmful substances is available on the JBPA website.

With regard to Japanese policies on bioplastics, the Government has set a clear policy direction through its Plastics Strategy.

The Strategy sets the goal of introducing 2 million tons of biomass plastics by 2030. Initially presented in Japan's 2016 Global Warming Countermeasure Plan (GWCP), this target was in part motivated by national climate ambitions, and directly lifted from the GWCP itself.

To help reach this ambitious target, a draft of national implementation plan, called "Roadmap for introducing bio-plastics", was released in December 2020 (see chapter 2). As a reminder, measures include: to make full use of valuable bio-plastics, facilitate joint recycling of bio and petrochemical plastics; allow for agricultural applications, among others.

The Plastics Strategy also stresses that biomass plastic is particularly well-suited to combustion, for example by burning plastic bags alongside other waste. This raises the question of policy coherence with the first-order objective of reducing waste, the first 'R' or the '3Rs' policy. It should also be noted that there is opposition to such 'burnable' specification for biomass plastics. Indeed, CO_2 emissions do not depend on whether plastic is burnable or sustainable, rather on the total amount of plastics burnt in the first place, whether they are from petrochemical or biomass sources (Nakatani, 2019).[118] Nevertheless, Japanese industries, including JPIF and CLOMA, support the national Plastics Strategy, and have developed and introduced many kinds of bio-based and biodegradable plastics and alternative materials, in line with the 2030 target.

In addition to the above, a new policy approved in February 2020 under the Japanese green purchasing law also encourages the use of recycled or bio-based plastics. These alternatives to common plastics are included in the evaluation criteria guiding green purchases, with a detailed set of requirements laid out. For instance, for photocopiers, at least one of the parts weighing over 25g must be made of recycled plastic or reused plastic parts. For office furniture, either recycled plastic must make up at least 10% of the overall weight, or bio-based plastics whose environmental load reduction effect has been confirmed must make up at least 25% of the overall weight of total plastics used. The bio-based synthetic polymer rate must account for at least 10%.[119]

In line with these legal aspects, Eco Mark also published in February 2020 a new set of guidelines, called the "Basic policy for plastic resource circulation for Eco Mark"[120]. This document is expected to complement the evaluation criteria under the green purchasing law mentioned above. According to Eco Mark's certification policy, the certification process should consider first and foremost whether a biodegradable material is necessary and relevant for the intended use, with the expectation that the biodegradable plastic would degrade in natural environments, and by natural processes. An example of this are the plastic films used in agricultural fields for the purpose of maintaining good growing conditions (see Figure 7). Such films are difficult to recover and to dispose of. Thus, it is preferable for such plastic to degrade naturally into the soil as compost, rather than to linger in fields as a source of pollution. Hence, such biodegradable plastics have already been certified under the Eco Mark label.

[118] Reference: http://ieei.or.jp/2019/08/expl190823/#more-51725 (Japanese only)
Burning waste from biomass plastic also generates CO_2 emissions, just as burning waste from petrochemical plastic.
[119] Reference: https://www.env.go.jp/policy/hozen/green/g-law/archive/bp/r1bp_en.pdf
[120] Reference: https://www.ecomark.jp/pdf/plastic-policy2020.pdf (Japanese only)

Figure 7: An example of plastic film for agricultural purposes where biodegradable plastic is recommended[121]

Eco Mark has incorporated the international standard ISO16620-2 which provides a calculation method for the biobased carbon content of materials, which is necessary for evaluating overall CO_2 reductions in life-cycle assessments, as a certification process. Examples of such plastics include the following materials: PLA (polylactide), PE (polyethylene), PET (polyethylene terephthalate) and PTT (Poly-tri-methylene terephthalate).

While the Japanese Plastics Strategy sets an ambitious quantitative target for driving forward the market deployment of bio-plastics by 2030, other efforts, such as those led under Eco Mark's certification policy, seem to nuance this policy direction. By introducing the concept of 'necessary and relevant', this policy challenges the suitability of bioplastics for the intended use, and the production of the material in the first place. This approach is not dissimilar to the EU's more cautious take on bio-plastics, as presented below.

Bio-plastics and alternatives in the EU

As an overall objective, the New Circular Economy Action Plan's aim is to ensure that labelling a product as 'biodegradable' or 'compostable' does not lead consumers to dispose of it in a way that causes plastic littering, or pollution, due to unsuitable environmental conditions or insufficient time for degradation.

The Action Plan provides for the development of a policy framework covering the sourcing, labelling and use of bio-plastics (bio-based and biodegradable) according to key assessments. First for bio-based plastics, an assessment of whether the use of bio-based feedstock results in genuine environmental benefits, beyond a reduction in the use of fossil resources. Second for biodegradable or compostable plastics, an assessment of whether the use of these products can be beneficial to the environment, considering the applications in which they would be found, and sets criteria for such applications.

The Action Plan also prohibits the use of oxo-degradable plastics, as the oxidising additives added to accelerate biodegradation raise several concerns. Among these, they are often discarded improperly; once recycled, they lower the overall quality of the recycled material; in marine environments, they tend to degrade even faster than other plastics, which raises challenges for

[121] Reference: https://www.maff.go.jp/j/seisan/pura-jun/pdf/pura-jirei.pdf

the microplastics they release; and importantly, they lead to over-consumption of plastic bags by consumers.

Based on this first comparison of the situation with regard to bio-plastics in Japan and the EU, the following discussion points could be considered.

Bio-plastics and sustainable alternatives to petrochemical plastics – issues for consideration

- Do bio-plastics and other alternative materials comply with the concept of the circular economy?
- Is the increasing number and increasing diversity of "eco" materials causing more difficulties for recycling than solutions? How can the separate collection and appropriate treatment of such materials during the recycling phases be guaranteed?
- What uses are appropriate for bio-based plastics? Should bio-based plastics be supplied only for single-use?
- What uses are appropriate for biodegradable plastics? Are they really necessary for consumer goods if waste management is properly run? How harmful are biodegradable plastics to recycling loops?
- Do bio-based plastics really reduce life-cycle CO_2 emissions?
- Is the world able to produce enough bio-based plastic? Would it not compete with food production?

5. Possible policy tools and solutions

Throughout this Part I, the policies, regulations and activities of stakeholders in Japan and those in the EU have been reviewed and compared to highlight key issues in developing a CE. They can be summarised as follows:

- Reduce consumption of plastics, starting with SUPs;
- Promote eco-design to reduce waste and to improve durability, reusability, reparability, and recyclability;
- Create markets for secondary plastic materials;
- Find appropriate applications for sustainable bio-plastics.

In this section, possible policy tools and solutions to improve the circular economy are proposed. These recommendations are based on analyses and literature reviews, including recent OECD research.[122] **Erreur ! Source du renvoi introuvable.** below indicates the expected effectiveness of each action/policy tool proposed, based on analyses led by the authors.

[122] Reference : https://www.oecd.org/environment/improving-markets-for-recycled-plastics-9789264301016-en.htm

Table 6: Expected effectiveness of policy tools

Legend: VVV: Strongly and directly expected, VV: possibly expected, V: may be related, -: less related

Category of policy tools	Proposed policy tools	Reduce single-use plastic	Eco-design to reduce waste	Secondary plastics market	Bioplastic, sustainable alternatives
Economic tools	Pricing for single-use plastic	VVV	V	V	VV
	Carbon pricing	VV	VV	VV	VV
	Tax on virgin material	VVV	VVV	VVV	V
	EPR charge modulation	VV	VVV	VV	V
	GPP	VV	VVV	VV	VVV
Open Standards	Eco-design and recycle-friendly materials	V	VVV	VVV	V
	Eco-design and recycle-friendly products	V	VVV	VV	V
	Quality of secondary plastic materials	-	VVV	VVV	V
Integrated system for circular economy	Integrated regulation for material recycling	VV	VVV	VVV	VV
	Mandatory content of recycled material in products	V	VVV	VVV	V
	More sophisticated reuse, returnable, repair, and share system	VV	VVV	V	V
	More elaborate collection and separation system for high quality recycling	V	VV	VVV	VV
	Organise recyclers to boost the secondary materials market	-	VV	VVV	V
Partnership	Harmonised rules for imports and exports	VV	VVV	VV	VV
	Information-sharing on good practices	VVV	VVV	VVV	VVV
	Alliance of associations	VV	VVV	VV	VVV
	Market analysis of secondary plastics	-	VVV	VVV	V

Economic tools

Five different economic tools are listed as potential solutions to plastic waste, including:

- Pricing for SUPs;
- EPR charge modulation based on recyclability;
- Carbon pricing (CO_2 taxes, emission trading, carbon border adjustment mechanisms);
- Taxes on virgin materials; and
- GPP.

Economic tools can be used to promote or restrict certain products or services.

For example, mandatory charges on plastic shopping bags (as partly implemented in Japan) can prompt consumers to bring in their own reusable bags, although such a charge needs to be sufficiently high to send the right signal and not remain merely a symbolic action.

Furthermore, as one of the highest barriers to plastic recycling is its economic disadvantage compared to virgin materials, internalising the environmental cost of plastic consumption and pollution through appropriate pricing mechanisms (e.g. according to the polluter payer principles) would help lower overall consumption. Such economic tools can be valuable measures to promote plastic recycling whilst mitigating any disadvantages.

Open standards

The use of open standards could involve:

- Standards for eco-design and recycling-friendly materials, which may include labelling and restriction of additives and complex materials;
- Standards for eco-design and recycling-friendly products that are easy to repair, easy to decompose, easy to reuse, and easy to separate for recycling;
- Standards to guarantee the quality of secondary plastic materials.

For example, eco-design which encourages easier decomposition and separate collection of mono-materials should be standardised. To develop such a standard, multi-stakeholder discussions would be necessary. In addition to the supply side (producers and retailers), waste collectors, separators, processers and users of secondary materials should contribute to establishing a common understanding of “recyclability” to overcome any technical difficulties.

Integrated system for the circular economy through the value chain

Actions geared towards an integrated CE system would involve:

- Integrated policy and regulations for material recycling (not product-specific);
- More elaborate collection and separation systems for high quality recycling (including separate collection at retail shops);
- Mandatory content of recycled material in products;
- Encourage collaboration among recyclers to boost the secondary materials market;
- More sophisticated reuse, returnable, repair, and share system, supported by IT systems.

In addition to eco-design, an integrated system throughout the value chain would be necessary to improve plastic recycling. One of the keys to such a system is the separation of consumer waste into individual plastic materials. Methods of separation include separate collection from households by municipalities and mechanical separation after collection.

Such efforts for proper separation are meaningful only when the separated materials are utilised as secondary materials. To enhance the utilisation of recycled materials, the mandatory content of recycled plastic, as outlined in the EU’s CEAP, would be also effective. Both regulatory tools

and voluntary actions could be used to promote the utilisation of recycled materials. The recycling industry should also commit to the quantity and quality of recycled materials.

Integrated policy and regulations would also be necessary for such multi-stakeholder involvement throughout the value chain.

Partnerships

Effective collaboration among all stakeholders throughout the value chain and economies is essential, and could take the form of:

- Harmonised rules for imports and exports of secondary materials;
- Information-sharing on policies and good practices;
- Cooperation between existing initiatives, alliances and associations (e.g. EU Plastics Alliance and CLOMA);
- Market analysis of secondary plastics.

The tools listed above should ideally be harmonised between countries for smooth imports and exports of products and secondary resources. In addition to international and domestic regulations, further information exchange should be encouraged between business sectors through business associations and other partnerships. Among such information, research on the secondary materials market should be promoted for a more efficient market.

Summary of Part I

Part I has described the policies for and practices in plastic resource circulation in Japan and the EU and presents possible actions and tools for the future. Both Japan and the EU have implemented a wide range of policies and regulations relating to the circular economy, waste management and plastics, as well as a number of initiatives implemented by governments and the private sector. The following section is a summary of the main points.

Status in Japan

- Japan has a successful history of waste management and 3Rs. The Japanese framework of waste management and recycling is sector- and product-specific, and is managed by different administrations. The METI manages the production side, and the MOEJ the waste side. An integrated approach to plastic resource circulation transcending sectors and dovetailing the production and waste management sides is required. Efforts in this regard are underway (e.g. METI and MOE joint working groups) and need to be encouraged.
- Several good practices related to the circular economy are in place, such as recycling of PET bottles and home appliances. There are also advanced technologies such as chemical recycling and marine-degradable plastics. Such circular economy good practices should be given greater recognition, and generalised to other sectors.
- The role of large retail chains needs to be enlarged to encourage producers and consumers towards more eco-design and more recyclable collection.
- The recycling industry does not feature highly in the present stakeholder analysis. However, this industry should play a role in maintaining the quality of secondary materials and supplying them to producers. It should develop a quality standard covering

secondary plastics, and offer all other industries suggestions to enhance the recyclability of their products.

Status in the EU

- The EU has developed an integrated Circular Economy Action Plan policy which covers both the production and waste management sides, as well as different product categories including plastics in various sectors.
- Since 2015, eco-design has been the focus of the first and second CEAP. For plastics, improving recyclability is one of the key points of eco-design, and the concepts of mandatory content and EPR modulation have also been proposed recently. It would be beneficial to have more information about these upcoming regulations and standards.
- A European Strategy for Plastics in a Circular Economy (2018) sets numerical targets for plastic recycling. One of its focuses is to stimulate the secondary plastic market. It would be useful to have more information about the actual situation of the secondary plastic market (pricing, stakeholders, quality standards, etc.).
- It is the recycling associations themselves that have issued standard guidelines for recycling materials and eco-design. It would be useful to have more information about how these guidelines are working.

In addition to the issues for consideration listed in the above boxes which are the first port of call, the comparative analysis has also highlight some notable differences, as well as areas for mutual learning, between Japan and the EU that could inform future policy exchanges. These include:

- Targets and implementation methods to restrict SUPs differ between the EU and Japan. Effective monitoring methods are needed to assess the effectiveness of each approach. Additional measures should be implemented, if required.
- Japan appears to be more forthcoming than the EU in its bid to introduce bio-based and biodegradable plastics. It would be useful to have further discussions on the appropriate usage and expected effects of such plastics from political, technical, environmental and business viewpoints, including CO_2 reduction, resource circularity and marine litter.
- Finally, it would be beneficial to strengthen the partnership between Japan and EU in this field and to conduct more joint research efforts. A strong EU-Japan partnership is a guarantee of progress for all, and an opportunity to extend the partnership to Southeast Asia and other regions.

PART II: GREEN PUBLIC PROCUREMENT (GPP) POLICY

Chapter 5: Green Public Procurement (GPP) Policy in Japan

In line with the country's efforts targeting a circular economy, Japan has rich experience in public procurement applied to "green" products and "green" consumer-awareness. The country has high rates of GPP implementation and its GPP law has been established as part of the Basic Act on Establishing a Sound Material-Cycle Society, which is a key CE legislation in the country. However, there is still strong potential for accelerating efforts to realise a circular and sustainable society by the effective uses of GPP policies.

1. Overview of key GPP policies in Japan

Public purchasing power accounts for 20% of GDP in Japan.[123] Japan's green purchasing practices started in the late 1980s, with the launch of the Eco Mark Program in 1989 as a Type I environmental labelling scheme. Local governments started to increase their institutional green purchasing from 1994, and the Green Purchasing Network (GPN), a non-profit organization, was established in 1996. In 2001, the *Act on the Promotion of Procurement of Eco-Friendly Goods and Services by the State and Other Entities* defined procurement items and set the underpinning evaluation criteria. As mentioned above, this Act was established as one of the individual laws under the Basic Act on Establishing a Sound Material-Cycle Society. This means the country's GPP policy has been in line with the CE policy framework. In respect to plastic, the annually revised GPP Basic Policy was recently amended in February 2020 to include recycled and bio-based plastics.[124]

Another notable legislative measure is the *Law Concerning the Promotion of Contracts Considering Reduction of GHG Emissions by the State and Other Entities*, enacted in 2007. Under this law, government agencies and public institutions are required to adhere to green contracting requirements when purchasing electricity, automobiles and ships; carrying-out ESCO[125] projects; designing new buildings; and implementing industrial waste management processes.

GPP target institutions

While GPP implementation is mandatory for government agencies and public institutions, there are no quantitative GPP targets for them to meet. Instead, each public authority is required to develop its own set of GPP targets. Local governments and independent administrative institutions, however, have expressed a strong commitment to GPP on a voluntary basis: 65.5% of all local governments report that they systematically work on green purchasing.

However, implementation gaps between local governments/authorities still exist. Although all prefectures and large municipalities have established their own procurement policies, 53.2% of smaller municipalities reported that they were not systematically applying GPP guidelines, or that there were no specific actions/policies related to GPP according to a MOEJ survey in 2018.

[123] Reference: Calculated based on the statistical data from Cabinet Office. https://www.esri.cao.go.jp/index-e.html
[124] Reference: https://www.env.go.jp/policy/hozen/green/g-law/archive/bp/r1bp_en.pdf
[125] ESCO: Energy Services Companies

A 2019 GPP implementation ranking released by the GPN also pointed to a wide gap in the extent of green purchasing efforts, even among local governments tagged as "sustainable", such as the "Future Cities", "Eco Model Cities"[126] and "SDG Future Cities".[127]

In contrast, some small-sized municipalities are more advanced than national agencies. For instance, Sarufutsu Village (Hokkaido) received full marks in the 2019 GPN ranking, and has consistently done so since 2016. Susaki City and Kumamoto Prefecture also received full marks for an increase of more than 80% in the number of areas in which they are implementing green purchasing.[128]

GPP criteria

Japan's *Green Purchasing Act* defines 275 items in 22 categories covered by GPP rules, including paper, stationery, office equipment, home electronic appliances, vehicles, uniforms and work clothes, facilities, stockpiles for disaster, public work projects, and services (Cabinet Decision in February 2020).

Both designated procurement items and their evaluation criteria are revised annually by the MOEJ. The "Green Procurement Guidelines for Purchasers" published by the MOEJ states that purchasers are expected to understand these changes and act accordingly.

Recently, the *Green Purchasing Act* has been revised to include a two-tiered criteria system to provide an incentive to select products with higher environmental performance. The system will set minimum criteria to be met to pull procurers towards higher environmental performances. The aim is to promote low-carbon products and services in order to achieve the ambitious goals of the Paris Agreement and the SDGs.[129] In GPP processes, suppliers and procurers are also often suggested to refer to the Eco Mark-certified products. In this sense, Eco Mark and the *Green Purchasing Act* are complementary to each other. In response to the growing interest in circular economy, resource efficiency and plastics in Japan, both the GPP Act criteria and the Eco Mark certification criteria are regularly updated.

Monitoring and challenges

The Japanese government and agencies are required to track and report annually on both the amount of procured goods and services that comply with the designated categories, and on the ratio of such eco-friendly goods to total goods and services (UNEP, 2017). However, the current monitoring system is not sufficiently structured for accurately tracking progress towards circular economy deployment. The limited quality of data is also partly due to the difficulty of evaluating waste reduction as it refers to "waste that is not consumed" as a definition, as well as to existing industry practices that do not favour the reuse of plastics, and therefore have limited available statistics.

This lack of quality and tailored data prevents the development of GPP criteria for "reusing plastics" and its thorough quantitative tracking. To date, only a limited number of products, such as photocopy machines, are tracked that way. It is therefore hard for suppliers to develop new products, services and production processes that can facilitate the reuse of plastics. However,

[126] Reference: https://future-city.go.jp/en/about/
[127] Reference: https://www.kantei.go.jp/jp/singi/tiiki/kankyo/index.html (Japanese only)
https://japan.kantei.go.jp/98_abe/actions/201907/_00003.html
[128] Reference: https://www.gpn.jp/info/gpn/4b26ef7f-fde9-49ed-9093-fd9866d0cc4c (Japanese only)
*This ranking is based on an evaluation (out of a maximum score of 45) based on criteria set by GPN. This is based on information on local governments published in the MOEJ "Database of Green Purchasing Initiatives".
[129] Reference: https://www.env.go.jp/policy/hozen/green/g-law/archive/pre/guideline.pdf (Japanese only)

recycling is already well incorporated into supplier practices, for example the recycling of paper, plastic, and fibre.

Despite these difficulties, the recent international momentum on resource efficiency and the circular economy is expected to lead to solutions to these challenges.

There is already evidence that the application of GPP standards in Japan has led to positive results. According to MOEJ reports, the Japanese government applied GPP to 95% of designated procurement items in 2018. That year, market shares for all designated procurement items increased, with for example staplers taking 85.7% of the market share, plastic binders 78.6%, and fluorescent lamps 71.6%. With regard to CO_2 emissions, high market-share items are estimated to have led to a reduction of 681,934t in 2018. This is equivalent to the CO_2 emissions generated by about 332,000 household members. Regarding plastics, it was also calculated that GPP policies led to an estimated reduction of 147.5 tons in other plastic-made stationery in 2018 (MOEJ, 2018). While detailed estimates are still limited, the CO_2 reductions achieved through GPP give good reason to be optimistic. As the use of recycled plastics has been added as an evaluation criterion for more products, such as copiers and printers[130], further estimates and studies focusing on GPP's contribution to plastic use will be required in the future.

2. Key stakeholders and their respective roles

Governments and advisory committee

The MOEJ is in charge of general GPP matters and provides support for promoting GPP in the form of guidelines, platforms for information-sharing among stakeholders, and training for procurement staff.

An advisory committee convened by the MOEJ is responsible for developing a list of designated procurement items, as well as reviewing the policy and its criteria, and monitoring progress of implementation. The committee members usually include academics, law experts, consumer representatives, and government representatives from the METI, the Ministry of Land, Infrastructure, Transport, and Tourism (MLIT), and of course the MOEJ.

Information hubs and capacity building

- GPN (Green Purchasing Network)

The GPN has developed and published a wide range of support materials such as guidelines (developed for 15 product categories with over 15,000 certified products) and an online product database accessible to the public. The organisation also provides training sessions for procurement staff to raise awareness on GPP needs and establish/improve their own GPP policies in line with the GPP Act. As of 2015, it comprises more than 2,400 organisations from business, local government and NPOs/NGOs.

- Eco Mark

Ecolabelling is an important tool in the GPP process. In Japan, Eco Mark is the most well-known eco label (more than 90% of consumers are aware of it as an environmental logo) and is widely used in GPP. As the country's only Type I Ecolabel in accordance with ISO14020 and ISO14024, Eco Mark develops and revises each proposed product category and certification criteria based

[130] Reference: https://www.env.go.jp/policy/hozen/green/g-law/jisseki/reduce-effect_h30.pdf (Japanese only)

on products' life-cycle assessments. As of May 2020, 40,483 products had been awarded the Eco Mark label.

Initiatives (domestic and regional)

- International cooperation for ASEAN countries

The MOEJ has supported ASEAN member states through various knowledge-sharing symposiums and capacity building sessions on GPP legislations/criteria. At the request of the Ministry of Natural Resources and Environment (MONRE) of Vietnam, such technical support has been provided to help in the development of the GPP system and criteria in Vietnam. Eco Mark is also involved in this process.[131]

- GEN (Global Ecolabelling Network)

The GEN is a non-profit association established in 1994 to promote and improve the eco-labelling of products and services. Eco Mark is a member. One of its key objectives is mutual recognition of GPP criteria among GEN members, an issue of growing importance in the context of globalisation.[132]

- IGPN (International Green Purchasing Network)

The IGPN was established in 2005 with the aim of promoting GPP activities and harmonising GPP criteria and practices across the globe. Numerous training sessions and tools / guidelines for harmonisation have been developed through the network. The network covers Japan, Korea, Malaysia, Thailand, China, India, Vietnam, Hong Kong, Singapore, Taiwan, the Philippines and Indonesia. Japan has previously acted as its Secretariat, and it is currently chaired by China.[133]

- GPN Sustainable Procurement Action Program

This GPN-led programme aims to encourage Japanese public procurers to purchase products and services that consider not only environmental aspects, but also human rights and labour conditions, among other elements. By participating in this program, businesses can self-assess their products and services against set standards, as well as the environmental and social efforts made in their supply chain. The programme's aim is to help business suppliers and procurers in reviewing their business practices and in identifying ways to improve these in order to achieve their sustainability goals.[134]

- 10YFP / One Planet Network (SPP and CI-SCP programme)

As a global sustainable public procurement initiative, the 10YFP (One Planet Network) Sustainable Public Procurement (SPP) programme was launched in 2014. It was initiated by a partnership bringing together ICLEI Local Governments for Sustainability, the Environmental Development Centre of the Ministry of Ecology and Environment of China, the Ministry of Infrastructure and Water Management of the Netherlands and the UN Environment Programme. Eco Mark also participated in the programme's inception, and has contributed to the project since.[135] Under the One Planet Network, the Consumer Information for SCP (CI-SCP) programme is also aiming for sustainable consumption and production patterns by supporting the provision

[131] Reference: https://www.env.go.jp/policy/hozen/green/kokusai_platform/2018report/mat_01.pdf (Japanese only)
[132] Reference: https://www.globalecolabelling.net/gen-members/benefits-of-gen-ecolabel-membership/
[133] Reference: http://www.igpn.org/about/index.html
[134] Reference: https://gpn2030.wixsite.com/action-program
[135] Reference: https://www.oneplanetnetwork.org/sustainable-public-procurement

of quality information on goods and services.[136] Both Eco Mark and GPN are also involved in the Consumer Information for SCP (CI-SCP) programme as partner organisations.[137]

- The global knowledge exchange event 'Reduce! Rethinking the Circular Economy: A global knowledge exchange on Sustainable Development Goal (SDG) 12 policy tools' was hosted in September 2019 by the Thai Ministry of Natural Resources and Environment (MONRE) and financed by the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU). Several key regional organisations, including Eco Mark, were involved in the initiative and shared experiences among participating stakeholders in the region. At the event, a new programme was also launched to encourage selected ASEAN member states to introduce Type I Ecolabel and promote GPP.[138]
- At the Asia-Pacific regional level, several ongoing programmes target GPP, such as the "Asia Pacific Green Public Procurement and Ecolabelling (GPPEL) project", which is a network of green public procurement stakeholders in the region. The SPPEL project ("Stimulating the Demand and Supply of Sustainable Products through Sustainable Public Procurement and Ecolabelling") also contributes to regional green public procurement activities (UNEP, 2017). The roadmaps produced by the APRSCP (Asia Pacific Roundtable for Sustainable Consumption), an Asia-focused network for promoting a SCP concept, also identify the importance of GPP for sustainable consumption and production, as well as the need for further regional and international collaboration to enhance GPP practices in the region. Further research and projects in line with this vision are needed to accelerate regional action.

3. Global environmental goals and GPP – how these are treated in Japan

Although limited, a drive to incorporate into GPP criteria key global environmental goals, such as the SDGs and the Paris Agreement, is underway in Japan. In particular, public awareness of the SDGs has grown over the past few years and businesses have started to include SDGs in their operations and corporate policies/visions. Many suppliers are looking to reflect SDGs in their GPP implementation, and newly released SDG-related manuals, guidance and training courses have been made available by organisations such as the GPN[139] and Eco Mark.[140] Although a specific reference to SDGs has not yet been incorporated into the GPP Act, the importance of doing so has been discussed by the GPP Act working group. Eco Mark has also sought to integrate SDGs, the Paris Agreement, biodiversity, and plastics and the circular economy into its criteria.

[136] Reference: https://www.oneplanetnetwork.org/consumer-information-scp/about
[137] Reference: https://www.oneplanetnetwork.org/consumer-information-scp/actors
[138] Reference: https://www.thai-german-cooperation.info/en_US/thailand-and-germany-push-global-knowledge-exchange-to-rethink-circular-economy/
[139] Reference: SDGs Action Programme (operated by GPN): https://gpn2030.wixsite.com/action-program/sdgs (Japanese only)
[140] Reference: SDGs Utilization Guide for Eco Mark-certified Business Operators: https://www.ecomark.jp/pdf/SDGs.pdf (Japanese only)

Box 5 Eco Mark policy for plastic resource circulation

Box 5: Eco Mark policy for plastic resource circulation

In February 2020, Eco Mark published a policy for plastics resource circulation and the circular economy. It defines the following policies and measures to promote the 3Rs and renewables:

(1) Develop evaluation criteria to promote the reduction and reuse of plastics, expand the use of bio-based plastics and increase the use of recycled plastics;

(2) Do not certify single-use plastic bags as "Eco Mark products for appropriate resource use";

(3) Certify biodegradable plastics only when they are used in the environment, difficult to collect, and that their biodegradability is ensured;

(4) Expand product-service systems, such as sharing services for reducing the environmental impact of society as a whole.

(Source: https://www.ecomark.jp/pdf/PR19-13.pdf)

(Note: In this policy document, product-service systems are described as the businesses combining products and services (Product/Services Systems (PSS)) in addition to traditional commercial transactions that are completed when a product is sold. PPS has the potential to reduce the environmental negative impact (or resource saving and recycling) by optimizing society as a whole, as well as to change the consumer lifestyles by sharing products, making effective use of plastic and other resources, and using products for a long time through appropriate maintenance.)

Further to the example of Eco Mark's efforts, other initiatives have been led by other entities, such as the Tokyo 2020 Olympic and Paralympic Games Organising Committee, as the box below illustrates.

Box 6: Sustainable public procurement for the Tokyo Olympics[141]

Box 6: Sustainable public procurement for the Tokyo Olympics

The Tokyo 2020 Olympic and Paralympic Games Organising Committee set out some fundamental principles for ensuring sustainable sourcing, in order to promote and implement public procurement within a holistic view of sustainability.

The four principles of the Tokyo 2020 Sustainable Sourcing Code cover:

- how products and services are supplied;
- the origins and resources used for products and services;
- compliance with the Sourcing Code throughout the supply chain; and
- the effective use of resources.

Based on the above principles, the Tokyo 2020 Organising Committee established sustainability standards covering general affairs, the environment, human rights, labour, and economy issues. Suppliers are required to meet each of these procurement standards. They have to implement sourcing practices in line with the GPP Act, as well as following the related policy standards developed by the Government of Japan, the Tokyo Metropolitan Government and other public authorities. The targeted environment areas are: energy savings; use of low-carbon or carbon-free energy; reduction of greenhouse gas emissions by other means; promotion of the 3Rs; reduced use of containers and packaging; prevention of contamination; management of chemicals and waste disposal; collection of raw materials with consideration for resource conservation; as well as conservation of biodiversity.

However, some NPOs/NGOs have noted that the actual actions undertaken are relatively slow and that the committees are not as proactive as those involved in the London 2012 Summer Olympics.

The Organising Committee is therefore expected to continue its efforts to accelerate the integration of sustainability aspects into national and local procurement policies and increase the actual uptake of sustainable criteria in the country.

Source: https://tokyo2020.org/en/games/sustainability/

[141] Reference: "Tokyo 2020 Olympic and Paralympic Games Sustainability Plan Version 2". (June 2018). https://gtimg.tokyo2020.org/image/upload/production/jyt3ocxciw8shkus9vqd.pdf

Chapter 6: Green Public Procurement (GPP) Policy in EU

The European Union also has longstanding experience in strategically applying public procurement to reach environmental and societal goals, as well as using well-defined GPP criteria linked to circular economy concepts. However, ensuring actual uptake of those criteria and reducing implementation gaps among the member states remain a challenge.

1. Overview of GPP policies in the European Union

Across the 27 EU Member States (MS), public authorities' purchasing power accounts for 14% of GDP[142] and is expected to serve as a powerful driver of demand for sustainable products. MS are required to follow the EU Directive on public procurement (2008/2014), and to develop their own individual national action plans or policies. As of 2017, 23 national action plans had been developed.[143]

The EU Public Procurement Directives (2014)[144]

The EU Public Procurement Directives also set "core" and "comprehensive" criteria to ensure respectively that minimum environmental standards are met, and that the best environmental products are also encouraged. These criteria are developed by the Commission's Joint Research Centre's Institute for Prospective Technological Studies (JRC-IPTS) in Seville, Spain, based on an annual GPP work plan. This work plan is developed in consultation with the EU informal GPP Advisory Group, which acts as a consultative body for general GPP policy issues and for the development of EU GPP criteria.[145] With the overarching objective of pursuing societal issues of common interest, the Directives also cover a set of issues underpinning green public markets, namely requirements for contracts, use of ecolabels, and life-cycle costings, among others.

Circular Economy Action Plan for a Cleaner and More Competitive Europe (2020) and European Strategy for Plastics in a Circular Economy (2018)

The EU's 2020 Circular Economy Action Plan (CEAP) also emphasises the importance of public purchasing to the circular economy, and defines a "Sustainable Product Policy Framework" including minimum mandatory GPP criteria, sectoral targets, the phase-in of mandatory reporting, capacity building, and dissemination of good practices to ensure that products on the EU market are sustainable and circular.

Its 2015 predecessor also identifies GPP as a key component of the circular economy, the need to address issues such as durability and reparability in GPP criteria, and for the European Commission to support GPP implementation.

In the same vein, the 2018 European Strategy for Plastics in a Circular Economy (the EU Plastics Strategy) recommends that public procurement is applied to incentivise plastic waste prevention,

[142] Reference: https://ec.europa.eu/growth/single-market/public-procurement_en
[143] Reference: https://ec.europa.eu/environment/gpp/action_plan_en.htm
[144] Directive 2014/23/EU of the European Parliament and of the Council on the award of concession contracts ('the Concessions Directive'); Directive 2014/24/EU of the European Parliament and of the Council on public procurement and repealing Directive 2004/18/EC ('the Public Sector Directive'); and Directive 2014/25/EU on procurement by entities operating in the water, energy, transport and postal services sector and repealing Directive 2004/17/EC ('the Utilities Directive')
[145] Reference: https://ec.europa.eu/environment/gpp/gpp_criteria_process.htm

reuse of plastic items and packaging, improved recyclability of plastics, as well as greater integration of recycled content.[146]

Several support tools are available for encouraging mutual learning on best practices, such as the "Buying green handbook" or "Guidance for bio-based products in procurement".

The concept of circular procurement can be defined as the application of public procurement processes for stimulating the development of circular products, practices, businesses, markets and the overall economy.

The EU's thinking on circular procurement is partly encapsulated in the following texts:

- 'Public procurement for a circular economy: Good practice and guidance' (2017) brochure,[147] which defines circular procurement as: '*the process by which public authorities purchase works, goods or services that seek to contribute to closed energy and material loops within supply chains, whilst minimising, and in the best case avoiding, negative environmental impacts and waste creation across their whole life-cycle*'.
- The 2019 GPP training toolkit Module 5 (GPP and the Circular Economy): '*For the circular public procurement cycle, it is important to have whole lifecycle thinking. Considering circularity in procurement does not just focus on tendering - circular procurement considers how the product or service will be used and disposed of, as well as where it came from, what it is made from and how it is made.*[148]

2. GPP and CE stakeholders in the EU: the example of ICLEI

The International Council for Local Environmental Initiatives - Local Governments for Sustainability, known as ICLEI, is a global network of local governments leading sustainable urban development activities (policy advocacy, advice, best practice sharing, etc.).

Its work stands out as a remarkable contribution, among other valuable initiatives, of the work led by local authorities to advance the circular economy. It plays a leading role in the development of tools to support local governments in their GPP and SPP processes, as well as building a wide range of platforms and networks in Europe. Some of ICLEI's main initiatives and networks, supported by EU funding, include:

- Procura + Network European Sustainable Procurement Network: A network of public authorities and regions in Europe sharing knowledge on sustainable- and innovation-centred procurement. Also runs a best practice awards scheme among members. Membership includes 16 countries and 42 authorities as of May 2020.[149]
- Sustainable Procurement Platform: An online hub for sustainable procurement providing a wide range of case studies, training, guidance documents, tools, as well as running various programmes and projects.[150]
- Innovation Procurement Platform: An online platform providing information, guidance, advisory services on best practices for innovation procurement with some linked to environmental objectives.[151]

[146] Reference: https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1516265440535&uri=COM:2018:28:FIN and https://ec.europa.eu/environment/circular-economy/pdf/plastics-strategy-brochure.pdf
[147] Reference : https://ec.europa.eu/environment/gpp/pdf/cp_european_commission_brochure_en.pdf
[148] Reference: https://ec.europa.eu/environment/gpp/toolkit_en.htm
[149] Reference: https://procuraplus.org/home/
[150] Reference : https://sustainable-procurement.org/sustainable-public-procurement/
[151] Reference: https://innovation-procurement.org/

A number of other EU-funded projects have been implemented under the leadership of the ICLEI, at both European and global levels, including:

- CityLoops – Closing the loop for urban material flows (2019-23): This project was launched in 2019 to embed circularity into the planning and decision-making processes for construction and demolition waste, as well as organic waste in European cities, by developing a series of innovative procedures and tools. As of May 2020, seven European cities (Høje-Taastrup and Roskilde in Denmark; Mikkeli in Finland; Apeldoorn in the Netherlands; Bodø in Norway; Porto in Portugal; and Seville in Spain) were involved in this initiative as demonstrators. Building on the strength of these seven demonstrations, the project plans to examine possible ways to create markets for innovative circular economy products and solutions.[152]
- PlastiCircle (2017-20): The PlastiCircle initiative focuses on transforming waste into valuable products. Efforts have been made to develop smart containers for separate waste collection, improve transport routes and sorting, reprocess technologies, as well as defining business plans and promoting ways to replicate the proposed solutions. Three European cities (Alba Iulia in Romania, Valencia in Spain, and Utrecht in the Netherlands) have been designated as pilot cities for the project.[153]

3. Global environmental goals and GPP in the EU

The EU has taken an integrated approach to GPP by including various environmental goals such as the SDGs, biodiversity, climate change, circular economy, and SPP. For example, Germany has promoted sustainable public procurement in line with circular economy concepts (see Box 7). Several decision-making tools are now also available, such as the "Sustainability Compass,"[154] an online guide to sustainability criteria and labels which aims to integrate sustainability specifications into public procurement, stimulate demand for more sustainable products, and lead to increased circularity.

[152] Reference: https://iclei-europe.org/projects/?c=search&uid=3LBRSCRF
[153] Reference: https://plasticircle.eu/home/
[154] Sustainability Compass, https://www.kompass-nachhaltigkeit.de/en/

Box 7: New German laws and Circular Public Procurement

Box 7: New German laws and Circular Public Procurement

Germany has a long tradition of GPP with a legal framework for sustainability aspects based on the existing EU Directive for public procurement. However, clarity in the existing regulations is still lacking, leading procurers to buy the cheapest product without examining economic efficiency with regard to life cycle or environmental costs.

The German Federal Environment Ministry recently adopted the *Federal Climate Change Act* (December 2019). This Act aims to contribute to the climate neutrality objective by 2050 through legally binding climate targets, as well as the 2030 target to reduce greenhouse gas (GHG) emissions by 55% (compared to 1990). Public procurers are also required to consider the climate targets in their purchasing processes under this Act, which is expected to increase sustainability and hopefully circularity.

A draft amendment to the Circular Economy Act is being discussed in parliament. The amendment will require the federal administration to select resource-efficient products and services; in the current Act, public procurers are only required to check whether a resource-efficient product might be procured.

The German Environment Agency (UBA) published in July 2020, however, gives guidelines on public procurement of products with recycled plastics content, based on the Blue Angel eco-label requirement. The objective of the guidelines is to increase sales of recycled plastics and strengthen their recycling. Certain types of plastic are excluded because the presence of certain pollutants in the finished products cannot be fully excluded. Requirements covering additives to the plastics are also made.

Reference: https://ec.europa.eu/environment/gpp/pdf/news_alert/Issue_96_Interview.pdf

Reference: https://www.umweltbundesamt.de/sites/default/files/medien/376/publikationen/leitfaden_zur_umweltfreundlichen_oeffentlichen_beschaffung_produkte_aus_recyclingkunststoffen_stand_2020.pdf)

Chapter 7: Summary and comparison of GPP policies of the EU and Japan

GPP has strong potential to create a circular economy through promoting new practices, markets and products. However, to achieve greater GPP improvements, a well-structured policy framework, meaningful commitments, coordinated efforts by multiple stakeholders and robust verification systems are needed in both the EU and Japan.

1. Summary and key challenges for circular procurement

In Japan

Japan's GPP policies have long been used as an important tool to encourage environmentally friendly products and raise citizens' awareness in this regard. For example, the GPP Act places strong emphasis on recycled materials. However, the focus to date of Japanese GPP policies has been on products rather than services, with a limited number of circular items being covered. As attention has been placed first and foremost on ensuring actual uptake of GPP products through practical criteria, the policy rationale and broader environmental objectives pursued by such GPP policies have at times gone astray.

Varying levels of implementation by local governments and authorities are also seen, in part due to a lack of awareness among procurement staff. A GPN 2019 ranking highlighted that some local administrations are lagging behind in their implementation of GPP practices, even in some of the more emblematic "Future Cities", "Eco Model Cities"[155] and "SDG Future Cities",[156] which have made strong sustainability commitments.[157]

In the EU

In the EU, GPP policy has focused on achieving synergies with broader policy visions such as circular economy or SDGs, but the lack of mature markets, standards and certification schemes limit the practicability of GPP criteria, and therefore greater circular economy uptake. For example, for the production of textiles, fabrics must contain at least 20% of recycled polyester, but only a small number of companies supply such material.[158] Thus, focusing on product groups with high environmental impact potential could be helpful.

The lack of clear definition of 'circularity' or 'circular economy''[159] also limits the practicability of GPP criteria applied to CE objectives. This leads to difficulties in setting the necessary systems supporting circular procurement, including monitoring and verification systems of CE products/services.

Gaps in implementation of GPP National Action Plans based on the EU Directives also exist and would benefit from being addressed. New, or additional, efforts by businesses and MS governments, as well as advanced verification systems for enhanced enforcement and monitoring, could help overcome implementation inconsistencies. Such implementation challenges and good

[155] Reference: https://future-city.go.jp/en/about/
[156] Reference: https://www.kantei.go.jp/jp/singi/tiiki/kankyo/index.html (Japanese only)
https://japan.kantei.go.jp/98_abe/actions/201907/_00003.html
[157] Reference: https://www.gpn.jp/info/gpn/4b26ef7f-fde9-49ed-9093-fd9866d0cc4c (Japanese only)
[158] Reference: Directorate General for Internal Policies (2017) Green Public Procurement and the EU Action Plan for the Circular Economy. https://www.europarl.europa.eu/RegData/etudes/STUD/2017/602065/IPOL_STU(2017)602065_EN.pdf
[159] Reference: https://www.oecd-ilibrary.org/sites/5ab8c6da-en/index.html?itemId=/content/component/5ab8c6da-en

practices for overcoming these issues should be shared and updated through regular dialogues between the EU and Japan, as well as among the EU member states.

There are still notable gaps in the implementation of GPP policies in both the EU and Japan. One reason is that GPP practices are mostly applied on a voluntary basis, with local implementation often lagging behind national-level implementation. This is compounded by some key missing elements, such as:

- practical and comprehensive criteria for the circular economy;
- comprehensive lifecycle costing methods;
- robust verification systems; and
- complete monitoring systems.

2. Possible tools for promoting GPP and circular procurement

Related to the above challenges, some drivers of GPP have been identified in order to make the transition to the circular economy even more relevant. These cover GPP in general, and circular procurement in particular, as presented hereafter.

GPP

- Stricter approaches to GPP instead of voluntary ones.

Applying stricter requirements to GPP applications may, however, be a double-edged sword. For example, Japanese GPP is mandatory for national governments and agencies, with the consequence that procurers tend not to be aware of the significance of GPP itself, as they focus only on complying with the law. Conversely, some local governments and private sectors, which are required to make efforts on a voluntary basis, promote GPP unaided, and are more forthcoming than national governments/agencies in this regard. Thus, obsolete mandatory requirements should be revised or replaced through a more integrated and systemic approach to circular procurement with a focus on flexibility, quantification of targets, or inclusion of the circular economy into GPP policies and National Action Plans.

- Support for local governments and suppliers should be increased in both the EU and Japan in order to encourage GPP.

This could take the form of training, the provision of decision-making tools, further information-sharing between experienced and inexperienced suppliers, or many other avenues for collaboration.

- Better indicators for monitoring the actual cost of GPP.

The current GPP monitoring schemes tend to focus on reducing negative environmental impacts, such as GHG emissions or plastics use. But GPP processes should also seek to avoid unnecessary purchases in the first place. Monitoring indicators should therefore be developed to track the actual cost of buying and using a product, rather than focus only on total reduction rates. For plastics, the guidelines on recycled plastic contents and quality control of recycled products should be developed and introduced into GPP policies, as well as into the corresponding monitoring indicators.

Circular public procurement

- Select focus on products with high environmental impact.

The emphasis should be placed on product groups that have a significant environmental impact. In the context of plastics, the focus should be on developing criteria that support the circular economy, particularly the development of sustainable alternatives to plastic, new circular economy business models for reducing the use of plastics, or increasing the use of products with high rates of recycled content. It is also important that public-private sector dialogue informs such processes to ensure that the most appropriate directions are taken to attain set circular economy objectives.

- Encourage EU-Japan research collaborations focusing on the circular economy aspects of GPP.

Future research could cover, among other things, the use of single-use plastics during the COVID-19 pandemic to better assess the impact of safety and sanitisation over environment goals.

- Enhance cooperation, networks and partnerships at all levels in order to share best practices and experiences, and build further collaboration.

Compared to other key global environmental goals, there are not enough high-level, visible initiatives promoting GPP, SPP or circular procurement. New initiatives in this regard could also help other countries, particularly ASEAN Member States, and ensure further support from those countries with more GPP-related experience.

Summary of Part II

GPP could be an important policy tool for reducing the negative impacts of plastics on the environment and help create a circular loop by taking new policy directions towards GPP and other related policies such as eco-design, circular economy, and material-specific measures (including single-use plastics). However, it is also essential that procurers consider in the initial stages of procurement processes the need to purchase a good in the first place, as well as its circularity aspects. In addition to the procurement of consumables, procurers must understand GPP more broadly, along with its possible contributions to wider environmental and social issues.

Hence, the following topics of potential mutual interest could be worth considering for future EU-Japan collaboration:

- Application of GPP to plastics.

Japan and the EU could share policy experiences in applying GPP to tackle the plastics issue (e.g. results of integrating recycled plastic into criteria), or in creating and expanding new markets for green products.

- Implementation gaps.

Varying degrees of implementation between national and local governments, or between municipalities and member states, have emerged as a common challenge for the EU and Japan. Mandatory GPP may be one possible solution to facilitate such implementation; however, the policy effects should be considered in depth.

- Monitoring methods.

Applying GPP for a circular economy needs to be implemented by comprehensive lifecycle costing, monitoring, and verification systems. Knowledge-sharing on such best practices would be useful for Japan, the EU, and EU MS.

- Stakeholder collaboration.

Circular economy and circular procurement cannot be achieved without a good stakeholder engagement. There are already various regional / national / local networks for stakeholder engagement, including value-chain collaborations for a CE and GPP. Both Japan and the EU can share the experiences and expand these platforms as necessary.

PART III: SUMMARY AND WAY FORWARD

Chapter 8: Summary and Way Forward

1. Future EU-Japan policy exchanges under the Rethinking Plastics project: topics and stakeholders for consideration

Throughout the report, a number of potential topics of mutual interest to the EU and Japan have emerged. They cover a wide spectrum of policy, regulatory, business, consumer, economic, technological, communication issues upon that have a significant influence on the successful emergence of a fully-fledged circular plastic economy. Whether it is eco-design, secondary plastics, separate waste collection, bio-plastics or GPP, among others all of these issues are relevant to the effective emergence of an effective circular economy, whether in Japan or the EU. They remain the policy issues of primary importance in the fight against plastic pollution, and therefore should be considered in priority to inform future EU-Japan exchanges.

Tackling some the above policy issues is crucial to help improve the way plastics are devised, produced, consumed and disposed of. Such actions, however, cannot happen in a vacuum and require that a set of stakeholders take on active roles in their pursuit.

In this regard, the EU and Japanese governments remain first in line to take the necessary actions to accelerate policy implementation and establish further policy measures as necessary, including by drawing on policy best practice exchanges.

At the same time, the successful involvement of industry will be key to provide concrete solutions to plastics issues. In Japan, CLOMA (Clean Ocean Material Alliance) and JPIF (Japan Plastics Industry Federation) are expected to facilitate the necessary changes to shift the plastics production process from business-as-usual to a more circular approach, including through technology development for biodegradable plastics. However, these two alliances mainly comprise plastic manufacturers; manufacturers of automobile and home appliances, as well as retailers, should also show a stronger commitment. The Japanese waste management sector (both municipalities and recycling industries) should also be involved. Additionally, end-to-end economic action, such as that by members of the Japan business federation KEIDANREN, is expected to encourage businesses to conduct circular practices beyond their inter-industry boundaries.

In the EU, business associations such as the Circular Plastics Alliance and Plastics Recyclers Europe could be key players going forward. Global platforms such as the AEPW (Alliance to End Plastic Waste) could also be important information hubs for both European and Japanese companies.

Collaboration could also be extended to regional and/or multi-lateral levels. The experience and knowledge of the EU and Japan could be useful in developing a policy framework on plastics resource circulation in emerging ASEAN countries, for example. Cooperation with Asia-Pacific oriented organisations such as the APRSCP (Asia Pacific Roundtable on Sustainable Consumption and Production) could be considered.

On the subject of the ASEAN region, the ADB and the World Bank have contributed to developing a regional policy framework on plastics. For data collection and knowledge-sharing at the regional and national levels in the ASEAN, Japan's ERIA Regional Knowledge Centre for Marine Plastic Debris and UN-ESCAP could also be identified as important actors, alongside IGES as one of the

main regional think-tanks. Such regional and international actors could contribute valuable insights to future EU-Japan dialogue, drawing from their respective streams of work.

2. Opening the scope of issues for future work

Drawing from the enclosed analysis, additional topics have been identified for future work and research, reaching beyond the timeline of the project and the scope of discussion.

- Developing knowledge platforms covering experiences from Japan, the EU, as well as the Asia-Pacific region.

Japan and the EU governments have rich policy experiences, business practices, and networks covering plastics, circularity, and public procurement that could benefit other countries and sectors. The Rethinking Plastics project could contribute to encouraging bilateral dialogue with both political and public-private objectives in mind. At the same time, as this project has been implemented across the Asia-Pacific region, it could also help promote further information-sharing and mutual learning between countries in Asia, as well as in the EU. This could eventually take the form of a dedicated information-sharing platform, drawing on the existing project website.

- Support policy frameworks and business collaboration on plastics with a focus on circularity.

The project could support policymaking in Asia and the Pacific, particularly in emerging countries. As a number of international projects already focus on marine plastic litter, the Rethinking Plastic initiative could cover broader policies and integrate concepts of circular economy and GPP. Such work could also facilitate public-private dialogue in the region, noting that close coordination with ongoing international projects would be necessary to avoid overlaps, and maximise synergies.

- Research at the service of policy at national and regional levels

The project could also contribute to further research on circular economy, plastics, and public procurement issues. As the world is targeting a carbon neutral society by 2050, effective policy options for individual countries could be proposed, along with an optimised plastic circulation system across the Asia-Pacific region. Discussions between the EU and Japan could identify the advantages and challenges of both downstream and upstream approaches. Further research could therefore aim to analyse better solutions for both the EU and Japan, as well as identify opportunities for expanding these solutions into ASEAN countries.

- Support circularity that encompasses the entire socio-economic system

The promotion of eco-design for the whole socio-economic system, and not only for individual products and services, based on a shared vision of ‘circularity’ among key actors, could be discussed. While Japan’s policies tend to treat upstream and downstream approaches separately, EU policies have focused on integrated measures. In this sense, the EU and Japan could learn from each other to strengthen their current actions, and make further progress in this foundational issue of the circular economy.

- Developing active cooperation mechanisms across the whole value chain

Discussions could cover new legislative measures and incentive systems that help promote active cooperation mechanisms throughout the entire value chain, from upstream to downstream sectors. A holistic approach is important to succeed in building a circular economy. Governments, including those of the EU and Japan, could support collaboration across stakeholders, including plastic production industries, retailers, recycling companies, local government, and consumers.

- Updating GPP procedures to respond to global agreements and social change

Exchanges could examine how public procurement can, and should, contribute more to global environmental goals on climate, the SDGs, and circular economy. To date, the integration of other environmental policies has been missing in Japan, while the EU has more experience in this regard. The EU's current efforts to integrate the circular economy and the SDGs into public procurement could therefore be useful to Japan. At the same time, in response to the recent rapid expansion of e-commerce, it is necessary to promote green purchasing through effective cooperation with online platforms (e.g. Amazon and the likes). Examples of this exist in Japan, where one of the leading e-commerce companies, Rakuten, Inc., promotes an initiative called "Earth Mall with Rakuten" which features sustainable products, notably those with internationally recognised certifications (MSC for sustainable fishery, FSC for sustainable forest management, "Fairtrade" and other eco-labels).[160] More initiatives and collaborations like these would be desirable to ensure that GPP/SPP products are referenced on such platforms, and increase the promotion and harmonisation of green consumption.

- Promoting further EU-Japan co-funded research on plastics, circular economy, and procurement systems, even in the challenging current climate

The COVID-19 global pandemic has created disincentives for the circular economy, such as an increase in single-use plastics, a decrease in shared business, lower overall revenue and investment surpluses, and an emphasis on safety and sanitisation rather than the environment. The EU has launched a Green Recovery Plan to address this situation; however, Japan lags far behind in this area. Further research cooperation in relation to the post-COVID world could be considered as one of the key research areas. In the areas of plastics and circular economy, a number of research projects are being carried out in Japan and the EU. For example, in Japan, government-funded research will start in 2021 focusing on the system development of plastics for circular economy and controlling leakage into the ocean.[161] Research funding has also been provided by funding agencies in Japan as well as the EU. Since a number of plastic-related projects are already under way, further collaboration among academia should be encouraged.

- Developing future partnerships, but also effectively utilising existing platforms/initiatives

The dialogue could cover how national, regional, and international partnerships and networks could be fostered to facilitate information and knowledge sharing, and to initiate future collaboration efforts. However, before initiating any new platforms or initiatives, it is also important to properly analyse and coordinate existing ones, including those led by the EU and Japan. Indeed, following the global momentum on plastic issues, a variety of projects and initiatives are already

[160]References: https://global.rakuten.com/corp/sustainability/environment/ and https://sustainabledevelopment.un.org/partnership/?p=30633

[161] Reference: https://www.erca.go.jp/suishinhi/koubo/pdf/r03_s2-19_gaiyou.pdf (Japanese only)

in place in specific regions, such as the ASEAN. In this regard, the E-READI (Enhanced Regional EU-ASEAN Dialogue Instrument) programme has been actively working towards strengthening the EU-ASEAN networks and exchanging policy best practices, including on circular economy and plastics issues. Regular discussions are also held in various forums such as the G20 Resource Efficiency Dialogue, or the Circular Economy Missions. Furthermore, other international organisations are also active in this field, and would be worth liaising with. These include: the work of the Asian Development Bank and World Bank on developing an ASEAN regional policy framework on plastics; Japan's funded ERIA (Economic Research Institute for ASEAN and East Asia) Regional Knowledge Centre for Marine Plastic Debris for data collection and knowledge-sharing; or the work for city-engagement to create a local circular economy loop of plastics led by the UN-ESCAP (Economic and Social Commission for Asia and the Pacific). Such initiatives provide useful insights to inform future EU-Japan engagement on circular economy issues, and also bring useful experiences for other emerging ASEAN countries willing to tackle the plastics issues.

3. Final considerations

Tackling the marine plastic litter issue and realising a truly circular economy raises numerous and highly complex policy, societal, economic and environmental issues. Addressing these means navigating options that may seem colossal or even contradictory at times. Yet, the right decisions are not necessarily the hardest ones. Best practice sharing and collaboration among countries can offer great opportunities for mutual learning. As this comparative study highlights, both the EU and Japan can learn tremendously from one another in the pursuit of their common vision for a world free of plastic pollution and pervasive marine litter. While approaches sometimes differ, there is a shared willingness and ambition to reduce wasteful consumption of plastics, bolster the circular economy, create new jobs, employment, and activity by tackling the core challenges of plastic pollution and poor waste management. Given the complexity and variety of the issues to tackle, humility and close cooperation are of utmost importance for effectively overcoming the all-pervasiveness of plastics in today's societies. Leadership to manoeuvre these unchartered territories and to instigate new ways of thinking, doing, and living is necessary. Sharing past mistakes, failures and successes would be crucial to help other countries avoid known pitfalls, and accelerate the transition to their own circular economies. Given the breadth and depth of both the EU and Japan's policy experiences and frameworks, both countries have a lot to learn from one another, and can offer other countries their rich body of experiences. This report offers food for thought in doing so, and its authors sincerely hope it will serve this purpose with success.

Appendixes I-V

Summary table of Japan/EU policies and ISO/JIS standards on circular economy for plastics

Appendix I: Resouce Circulation Strategy for Plastics (Japanese Government, 2019)

	Title	Section	Reduction at Source	Creating a Market for Recycling	Sustainable Alternatives to Petrochemical Plastics	Others
Japanese Government (2019)	Resource Circulation Strategy for Plastics	Basic concept (3R)	Reduce usage of single-use plastic for package and products, which could be avoided. .	Effective recycling system through separation, collection and cyclical use (including thermal recovery).	Promotion of alternatives such as recycled materials and recyclable resources (e.g. paper, biomass plastics). For example, use biomass plastic bag for burnable waste.	- Prevent plastic to flow into the ocean. - Export the package of hardware and software with experience, technology and know-how.
		Strategic focus	- Mandatory charge for single-use plastic bag. - Promote eco-design such as light-weight and reuse package and products.	- Promote total system of effective and sustainable separated collection and recycling. - Collection and recycling of fishing gear on the land. - Consider various collection system at shops and other collection point including applying IoT technology. - Optimized collaboration with stakeholders through separated collection, transportation, segregation, recycling and utilization. - Eco-design and production of package and products for easier separation and higher reuse and recycle possibilities. - Utilizing various recycling technologies depending on quality and nature of plastic, such as material recycling, chemical recycling, and thermal recovery. - Establish international resource circulation structure. - Support inovetion and installing infrastructure for recycling. - Green public procurement initiative and promotion to consumers in accordance with Green Procurement Act. - Consider information handling of trace chemical additive content in plastic.	- Replace single-use package and products into alternatives such as recycled materials and recyclable resources (e.g. paper, biomass plastics). - Introduce biomass plastic by cost reduction and bio-degradable function especially for burning use. - Green public procurement initiative and promotion to consumers in accordance with Green Procurement Act. - Develop "road map for introducing bio-plastic".	**Marine plastic countermeasure** - Waste management on the land including preventing uncontrolled disposal and cleaning activity. - Reduce microplastics flowing into ocean. - Collection of marine litter. - Alternative innovation. - Understand actual situation of marine litter. **International cooperation** - Prevent generation of marine plastics at developing countries, including support for appropriate waste management system, resource recycling, and alternative material. - Global network for monitoring and research.
		Milestones	Cumulative 25% reduction in single-use plastics emissions by 2030.	- Reusable/recyclable design by 2025. - 60% rate of recycling/reusing for containers and packaging by 2030. - 100% effective utilization of used plastics by 2035 including thermal recovery. - Doubled use of recycled material by 2030.	Approximate 2 million ton introduction of biomass plastics by 2030.	

Appendix II: Resouce Circulation Strategy for Plastics (The Japan Plastics Industry Federation, 2019)						
JPFI (Japan) (2019)	Resource Circulation Strategy for Plastics	Basic concept	− Realization of optimum plastic utilization society under cooperation with the government, domestic/international related industries, etc. − Ulilize versatile and useful functions of plastics and reduce environmental burdens from the viewpoint of life cycle, thereby aiming for the use of plastics combined with the environmental considerations. − Utilize resources 100% effectively inconsideration of economic efficiency, technical possibilities, and other factors (including thermal recovery).			
		Strategy	Optimum plastic utilization	− Exporting of plastic waste should be reduced to zero at an early date, considering the overseas export ban. − Reduce einvironmental burdens through promotion of material recycling. Open up potential markets of recycled materials in japan and overseas countries. − Practical realization of sophisticated recycling technologies and sorting technoloties. − Make the discharge situation of plastic waste visible and promote establishment of stable supply chains of recycled materials. − Advance establishment of the incentive system regarding the use of recycled materials with the cooperation of the public and private sectors. − Practical realization of chemical recycling that restores waste plastics back to chemical raw materials.	− Reduction in environmental burdens through the use of biomass plastics. − Introduce biomass plastic to the plastics which must be incinerated such as waste disposal bag. − Expand public procurement by national and local governments, and usage incentive measures. − Further enhanced improvement in standards and certification system. − Promote research and development, aiming for practical realization of biomass−conversion of other general−purpose plastics.	Marine plastic litter − Leakage protection of resin pellet from industrial activity. − Expansion of participating companies /organizations to PR activities. − Collection and sharing of approach examples and publicity utilizing ″Plastics Smart″. − Participation in Japan Initiative for Marine Environment (JaIME) (Joint Executive Office). Proactive participation in Clean Ocean Material Alliance (CLOMA).

Appendix Ⅲ: A European Strategy for Plastics in a Circular Economy (EU, 2018)						
EU (2018)	A European Strategy for Plastics in a Circular Economy	Vision (general)	– A smart, innovative and sustainable plastics industry, where design and production fully respects the needs of reuse, repair, and recycling, brings growth and jobs to Europe and helps cut EU's greenhouse gas emissions and dependence on imported fossil fuels. – In Europe, citizens, government and industry support more sustainable and safer consumption and production patterns for plastics. This provides a fertile ground for social innovation and entrepreneurship, creating a wealth of opportunities for all Europeans.			
		Vison (for each item)	– Plastics and products containing plastics are designed to allow for greater durability, reuse and high-quality recycling. By 2030, all plastics packaging placed on the EU market is either reusable or can be recycled in a cost-effective manner. – Plastic waste generation is decoupled from growth. Citizens are aware of the need to avoid waste, and make choices accordingly.	– Changes in production and design enable higher plastics recycling rates for all key applications. By 2030, more than half of plastics waste generated in Europe is recycled. Separate collection of plastics waste reaches very high levels. – EU plastics recycling capacity is significantly extended and modernised. By 2030, sorting and recycling capacity has increased fourfold since 2015, leading to the creation of 200 000 new jobs, spread all across Europe.		– The leakage of plastics into the environment decreases drastically. – Innovative solutions are developed to prevent microplastics from reaching the seas. – The EU is taking a leading role in a global dynamic,
		Turning vision into reality(items that were not mentioned above)	– New guidance on separate collection and sorting of waste. – A legislative initiative on single-use plastics.	– Make chemicals easier to trace in recycled streams. – Develop quality standards for sorted plastic waste and recycled plastics. – Prioritise high food safety standards. – Interface between chemicals, waste and product policy is set to address. – By 2025, ten million tonnes of recycled plastics find their way into new products.	Restrict the use of oxo-plastics in the EU.	– A legislative proposal on port reception facilities. – Restrict the use of intentionally added microplastics. – EU research funding will support all these efforts. So far, Horizon 2020 has provided over EUR 250 million to finance R&D in areas of direct relevance to the strategy.
		ANNEX (items that were not mentioned above)		Commission guidance on the eco-modulation of EPR fees.	Start work to develop harmonised rules on defining and labelling compostable and biodegradable plastics.	Policy options for reducing unintentional release of microplastics from tyres, textiles and paint.

<table>
<tr><td colspan="6">Appendix IV: A new Circular Economy Action Plan for a cleaner and more competitive Europe (EU, 2020)</td></tr>
<tr><td rowspan="4">EU
(2020)</td><td rowspan="4">A new Circular Economy Action Plan for a cleaner and more competitive Europe</td><td>1. Introduction</td><td colspan="4">– The European Green Deal launched a concerted strategy for a climate–neutral, resource–efficient and competitive economy. Scaling up the circular economy to achieve climate neutrality by 2050 and decoupling economic growth from resource use. Reduce consumption footprint and double circular material use rate in the coming decade.
– For business, working together on creating the framework for sustainable products. Circular economy principles increase EU GDP by an additional 0.5% by 2030 creating around 700 000 new jobs.
– Digital technologies, such as the internet of things, big data, blockchain and artificial intelligence, will not only accelerate circularity but also the dematerialisation of our economy.
– For citizens, the circular economy will provide high–quality, functional and safe products, which are efficient and affordable, last longer and are designed for reuse, repair, and high–quality recycling.
– Reduce waste and ensure that the EU has a well–functioning internal market for high quality secondary raw materials.</td></tr>
<tr><td rowspan="2">2. Sustainable product policy framework</td><td colspan="4">– Designing sustainable products.Up to 80% of products' environmental impacts are determined at the design phase.
– Empowering consumers and public buyers. Provide them cost–saving opportunities by sustainable product policy framework. "Right to repair". Public authorities' purchasing power represents 14% of EU GDP.
– Circularity in production processes.</td></tr>
<tr><td></td><td></td><td>Supporting the sustainable and circular bio–based sector through the implementation of the Bioeconomy Action Plan.</td><td></td></tr>
<tr><td>3. Key product value chains</td><td colspan="2"><u>Electronics and ICT</u>
– Ecodesign Directive so that devices are designed for energy efficiency and durability, reparability, upgradability,maintenance, reuse and recycling.
<u>Packaging</u>
–Design for re–use and recyclability of packaging
<u>Plastics</u>
– Mandatory requirements for recycled content and waste reduction measures for key products such as packaging, construction materials and vehicles
<u>Textiles</u>
– The EU market for sustainable and circular textiles
<u>Construction and buildings</u>
– Recycled content requirements for certain construction products,
– Material recovery targets in EU legislation for construction and demolition waste</td><td><u>Plastics</u>
– Policy framework on sourcing, labelling and use of bio–based plastics, and use of biodegradable or compostable plastics.</td><td><u>Plastics</u>
– Address the presence of microplastics in the environment</td></tr>
<tr><td><u>Packaging</u>
– Reducing (over)packaging and packaging waste
– Design for re–use and recyclability of packaging
– Support the Drinking Water Directive to make drinkable tap water accessible to reduce dependence on bottled water
<u>Plastics</u>
– Implementation of the new Directive on Single Use Plastic Products and fishing gear (2019)
<u>Food, water and nutrients</u>
– Legislative initiative on reuse to substitute single–use packaging, tableware and cutlery by reusable products</td><td><u>Electronics and ICT</u>
– Restrictions of hazardous substances in electrical and electronic equipment.

<u>Batteries and vehicles</u>
– Rules on recycled content and improve the collection and recycling rates

<u>Packaging</u>
– Reducing the complexity of packaging materials, (including the number of materials and polymers used.)
– Assess the feasibility of EU–wide labelling
– Safe recycling into food contact materials of plastic materials other than PET.</td><td></td><td>(Section 5 and after)
<u>Making Circularity sork for people, regions and cities</u>
– Support of skills and job creation contribute also to accelerating the transition to a circular economy,
– EU financing instruments and funds to support the necessary investments at regional level
<u>Circularity as a prerequisite for climate neutrality</u>
– Modelling tools to capture the benefits of the circular economy on greenhouse gas emission reduction
<u>Getting the economics right</u>
– Taxonomy, finance, non–financial reporting etc.</td></tr>
</table>

		4. Less waste, more value	**Enhanced waste policy in support of waste prevention and circularity** – Halve the amount of residual (non-recycled) municipal waste by 2030. – Harmonise separate waste collection systems – Consumer involvement such as common bin colours, harmonised symbols for key waste types, product labels, information campaigns and economic instruments.	**Enhancing circularity in a toxic-free environment** – High-quality sorting and removing contaminants from waste. **Creating a well-functioning EU market for secondary raw materials** – Introducing requirements for recycled content in products for preventing a mismatch between supply and demand of secondary raw materials and expansion of the recycling sector. – EU-wide end-of-waste criteria for certain waste streams. Enhance the role of standardisation. **Addressing waste exports from the EU** – EU does not export its waste. "Recycled in the EU".		**Driving the transition through research, innovation and digitalisation** – Horizon Europe – lead efforts at international level to reach a global agreement on plastics – Propose a Global Circular Economy Alliance

Appendix V: ISO and JIS standards for plastic recycling

Alignment of standards is essential for the emergence of a fluid international market. The below table illustrates the differences between ISO and Japanese standards.

ISO		JIS[162]	
ISO 15270: 2008	Plastics -- Guidelines for the recovery and recycling of plastic waste	N/A	
N/A		JIS Q 9091: 2016	Quality management system -- Recycled plastic materials -- Guidelines for the performance of business processes
ISO 18601 to 18606: 2013	Packaging and the environment – • General requirements for the use of ISO standards in the field of packaging and the environment • Optimisation of the packaging system • Reuse • Material recycling • Energy recovery Organic recycling	JIS Z 0130-1 to 6: 2015	Packaging and the environment – Part 1: General requirements Part 2: Optimisation of the packaging system Part 3: Reuse Part 4: Material recycling Part 5: Energy recovery Part 6: Organic recycling
ISO 12418-1 and 2: 2012	Plastics -- Post-consumer poly(ethylene terephthalate) (PET) bottle recyclates -- Part 1: Designation system and basis for specifications and Part 2: Preparation of test specimens and determination of properties	JIS K 7390-1 and 2: 2015	Plastics -- Post-consumer poly(ethylene terephthalate) (PET) bottle recyclates -- Part 1: Designation system and basis for specifications and Part 2: Preparation of test specimens and determination of properties
ISO 18263-1 and 2: 2015	Plastics -- Mixtures of polypropylene (PP) and polyethylene (PE) recyclate derived from PP and PE used for flexible and rigid consumer packaging -- Part 1: Designation system and basis for specification and Part 2: Preparation of test specimens and determination of properties	JIS K 7393-1 and 2: 2018	Plastics -- Mixtures of polypropylene (PP) and polyethylene (PE) recyclate derived from PP and PE used for flexible and rigid consumer packaging -- Part 1: Designation system and basis for specification and Part 2: Preparation of test specimens and determination of properties
ISO/TR 17098: 2013	Packaging material recycling -- Report on substances and materials which may impede recycling	N/A	

[162] Reference: https://webdesk.jsa.or.jp/

In addition to the above standards, there are several Japanese ones (JIS standards) that have been developed for individual products made by recycled plastic. These standards, while fulfilling a role in the Japanese domestic market, add further challenges to aligning global, or EU-Japan, methods for producing and managing plastic.

- JIS A 5731:2002 Recycled plastics inspection chambers and covers for rainwater
- JIS A 5741:2016 Wood-plastic recycled composite
- JIS A 5742:2015 Products of wood-plastic recycled composite -- Assembled decks
- JIS A 9401:2007 Recycled plastics medial strip block
- JIS A 9402:2007 Recycled plastics buffers for parking
- JIS K 6932:2018 Recycled plastics stakes
- JIS K 9797:2006 Unplasticized poly (vinyl chloride) (PVC-U) three-layer pipes with recycled solid core
- JIS K 9798:2006 Unplasticized poly (vinyl chloride) (PVC-U) three-layer pipes with recycled foamed core
- JIS Z 0609:2017 Plastic flat pallets using recycled containers and packing
- JIS K 6930:1994 Reclaimed granular molding materials of agricultural polyvinyl chloride film
- JIS K 6931:1991 Reclaimed plastics bars, rods, plates and piles

Japanese translation of Appendix I to IV

Appendix I: プラスチック資源循環戦略（日本政府, 2019）

	Title	Section	Reduction at Source	Creating a Market for Recycling	Sustainable Alternatives to Petrochemical Plastics	Others
Japanese Government (2019)	プラスチック資源循環戦略	基本原則（3R）	【基本原則（3R）】 ワンウェイの容器包装・製品をはじめ、回避可能なプラスチックの使用を合理化し、無駄に使われる資源を徹底的に減らす。	【基本原則（3R）】 効果的・効率的なリサイクルシステムを通じて、徹底的に分別回収し、循環利用（リサイクルによる再生利用、難しい場合には熱回収によるエネルギー利用を含め）を図る。	【基本原則（3R）】 プラスチック製容器包装・製品の原料を再生材や再生可能資源（紙、バイオマスプラスチック等）に適切に切り替え。特に、可燃ごみ指定収集袋など。	【基本原則（3R）】 プラスチックの海洋流出防止。 海外へソフト・ハードの経験・技術・ノウハウをパッケージで輸出。
		重点戦略	【重点戦略】 レジ袋の有料化義務化。 軽量化等の環境配慮設計やリユース容器・製品の利用促進。	【重点戦略】 システム全体として効果的・合理的で、持続可能な分別回収・リサイクル等を適正に推進。 漁具等の陸域での回収、リサイクル。 多様な店頭回収や拠点回収、IoT技術も活用した効果的・効率的な回収方法を幅広く検討。 分別回収、収集運搬、選別、リサイクル、利用における各主体の連携協働と全体最適化。 分別が容易で、リユース・リサイクルが可能な容器包装・製品の設計・製造。 プラスチック資源の品質・性状等に応じて、材料リサイクル、ケミカルリサイクル、 熱回収を最適に組み合わせ。 国際的な資源循環に対応し、適切な資源循環体制を率先して構築。 リサイクル等の技術革新やインフラ整備支援。 グリーン購入法等に基づく率先的な公共調達、消費者への普及促進。 プラスチック中の化学物質の含有情報の取扱いの検討。	【重点戦略】 ワンウェイの容器包装・製品等は、再生材や、紙、バイオマスプラスチック等の再生可能資源への適切な代替。 バイオプラスチックの低コスト化・生分解性などの高機能化や、特に焼却・分解が求められる場面等への適切な導入支援。 グリーン購入法等に基づく率先的な公共調達、消費者への普及促進。 「バイオプラスチック導入ロードマップ」を策定。	【重点戦略】 （海洋プラスチック対策） ①ポイ捨て・不法投棄の撲滅、清掃活動を含めた陸域での廃棄物適正処理 ②マイクロプラスチック流出抑制対策 ③海洋ごみの回収処理 ④代替イノベーションの推進 ⑤海洋ごみの実態把握 （国際展開） ① 途上国における海洋プラスチックの発生抑制。適正な廃棄物管理システム構築、資源循環の取組。プラスチック代替品やリサイクル技術等に関するイノベーション・技術導入の支援 ② 地球規模のモニタリング・研究ネットワークの構築。
		マイルストーン	2030年までに、ワンウェイのプラスチック（容器包装等）をこれまでの努力も含め累積で25%排出抑制するよう目指す。	2025年までに、プラスチック製容器包装・製品のデザインを、技術的に分別容易かつリユース又はリサイクル可能なものとすることを目指す。 2030年までに、プラスチック製容器包装の6割をリユース又はリサイクルする。 2035年までに、すべての使用済プラスチックをリユース又はリサイクル、それが難しい場合には熱回収も含め100%有効利用する。 2030年までに、プラスチックの再生利用（再生素材の利用）を倍増するよう目指す。	2030年までに、バイオマスプラスチックを最大限（約200万トン）導入する。	

Appendix II: プラスチック資源循環戦略（日本プラスチック工業連盟, 2019）

JPFI (Japan) (2019)	プラスチック資源循環戦略	基本的な考え方	・行政、国内外の関連業界等との連携により、プラスチック最適利用社会を実現。 ・プラスチックの多様かつ有用な機能を生かし、ライフサイクルの視点から環境負荷を削減することにより、環境配慮との両立を目指す。 ・経済性及び技術的可能性等を考慮し、資源を100%有効利用する（エネルギー回収も含む）			
				・プラスチックくず輸出に関しては、海外の輸入禁止措置もあり、早期にゼロにする必要がある ・材料リサイクル推進により環境負荷を低減する。国内外の再生材の潜在市場を開拓する。 ・高度な再生化技術・高度な選別技術の実用化。 ・廃プラスチックの排出状況を可視化できるようにし、再生材の安定したサプライチェーンの確立を促す。 ・再生材の使用に対するインセンティブ制度作りを官民連携で進める。 ・廃プラスチックを化学原料に戻す、ケミカルリサイクルの実用化。	・バイオマスプラスチック使用による環境負荷削減。 ・燃やさざるを得ないプラスチック（ごみ袋等）をバイオマス化する。 ・国・地方自治体による公共調達、利用インセンティブ措置等。 ・規格、認証システムの更なる整備 ・その他汎用プラスチックのバイオマス化の実用化を目指して、研究開発を推進。	海洋プラスチック問題 ・工業プロセスからの樹脂ペレット漏出防止。 ・宣伝活動に取り組む企業や団体の拡大。 ・取組み事例の収集・共有・プラスチック・スマートを活用した広報。 ・海洋プラスチック問題対応協議会（JaIME）への参画（共同事務局）、クリーン・オーシャン・マテリアル・アライアンス（CLOMA）への積極的参加。

Appendix III: EUプラスチック戦略（2018）

EU (2018)	A European Strategy for Plastics in a Circular Economy （欧州プラスチック戦略）	Vision（総論）	デザインと生産に再使用・修理・リサイクルの必要性を十分に反映したスマートで革新的かつ持続的なプラスチック産業は，欧州に成長と雇用の機会を生むとともに，欧州のGHG 削減や化石燃料輸入への依存を減らすことに貢献する。 市民・政府・産業がプラスチックのより持続可能で安全な消費と生産パターンを支持し，社会革新と起業を促し，全欧州市民に富の機会をもたらす。			
		Vison（各論）	プラスチック製品の耐久性、再利用性、リサイクル性の向上。2030 年までに全プラスチック容器包装材の再使用もしくは費用対効果が高いリサイクルが可能になる。 プラスチックごみの発生と成長を切り離す(デカップリング)。消費者が廃棄物を減らす選択をする。	製品設計をリサイクル可能に変更することで、2030 年までに欧州で発生する廃プラスチックの半分以上がリサイクルされる。 2015 年比分別・リサイクル規模を4 倍とし，かつ関連産業における20 万人の雇用創出。		環境中へのプラスチック漏出の大幅削減。 マイクロプラスチックが海に到達するのを防ぐ革新的な解決策の開発。 国際的な関連プロセスにおけるEU のリーダーシップ。
		Turning vision into reality（具体的方策） （Visionの各論で言及されていなかった項目について）	廃棄物の分別収集と選別についての新しいガイダンスの策定。 使い捨てプラスチックへの法的な対応。	リサイクルの流れの中で化学物質の追跡を容易にする。 分別・リサイクルされるプラスチックの品質標準を作る。 その中でも、食品安全を重視する。 化学物質、廃棄物、製品の政策の接点の整合に取り組む。 2025年までに年間1千万トンのリサイクルプラスチックを商品化する。	酸化分解性プラスチックの制限。	港における廃棄物受け入れの法的提案。 マイクロプラスチックの意図的な添加の制限。 Horizon 2020を通じた研究投資2.5億ユーロ。
		ANNEXからの補足		EPR料金の環境調節(eco-modulation) に関する委員会ガイダンス。	コンポスト可能・生分解性プラスチックの定義と表示のルール策定。	タイヤ、テキスタイル、塗料からの非意図的なマイクロプラスチック放出を低減する政策。

<table>
<tr><td colspan="3">Appendix IV: EU新循環経済行動計画（2020）</td><td colspan="4"></td></tr>
<tr><td rowspan="4">EU
（2020）</td><td rowspan="4">A new Circular Economy Action Plan for a cleaner and more competitive Europe
新循環経済行動計画−よりクリーンかつ競争力の高い欧州へ</td><td>1. Introduction</td><td colspan="4">気候中立的で資源効率的また競争力の高い経済に向けた協調戦略として欧州グリーンディールを策定。循環経済をスケールアップし、経済成長と資源使用のデカップリングにより、2050年までに気候中立性を達成する。今後10年で、消費フットプリントを削減し、物質の循環使用を倍増する。
持続可能な製品枠組みの創出に向けた協働。循環経済原則の適用がEUのGDPを2030年までに0.5%増加、70万人の雇用創出。
IoT、ビッグデータ、ブロックチェーン、AIなどのデジタル技術が、循環経済と、経済の脱物質化を加速する。
市民に対して、循環経済は、高品質で機能的かつ安全、効率的で安価、長寿命、そして再使用・修理・高質リサイクルに適した製品を提供する。
廃棄物削減、より機能的な効率二次原材料の域内市場の確保。</td></tr>
<tr><td>2. Sustainable product policy framework
持続可能な製品政策枠組み</td><td colspan="4">持続可能な製品デザイン。製品の環境影響の8割は設計段階で決まる。
消費者と公共調達のエンパワーメント。持続可能な製品の政策枠組みにより、消費者のコスト削減の機会を提供する。修理権。公共調達はEUのGDPの14%を占める。
製造プロセスにおkる循環性。</td></tr>
<tr><td rowspan="2">3. Key product value chains
主要製品バリューチェーン</td><td colspan="2"><u>Electronics and ICT　エレクトロニクスとICT</u>
・エコデザイン指令により、エネルギー効率、耐久性、修理性、アップグレード可能性、保守性、再利用とリサイクルを考慮した設計。
<u>Packaging　容器包装</u>
・包装の再利用・リサイクルを促すデザイン
<u>Plastics　プラスチック</u>
・再生プラスチック含有量と廃棄物削減施策に関する必須要件の提案（包装、建設資材、車両等の主要製品に対して）
<u>Textiles　繊維</u>
・持続可能かつ循環型の繊維製品のためのEU市場
<u>Construction and buildings　建設と建物</u>
・特定製品におけるリサイクル材の要件導入
・建設・解体廃棄物に関する素材リカバリー目標</td><td>・バイオ経済行動計画を通じた持続可能・循環バイオベースセクター支援

<u>Plastics　プラスチック</u>
・バイオプラスチックの分類・ラベル・使用、生分解性・堆肥化可能なプラスチックの使用に関する政策枠組みの策定</td><td><u>Plastics　プラスチック</u>
・環境中のマイクロプラスチックへの対策</td></tr>
<tr><td><u>Packaging　容器包装</u>
・過剰包装と包装廃棄物の削減
・包装の再利用・リサイクルを促すデザイン
・ボトル使用削減のため、飲料水指令に関する要件設定のモニタリングと支援
<u>Plastics　プラスチック</u>
・使い捨てプラスチック製品と漁具に関する指令（2019年）の実施
<u>Food, water and nutrients　食品・水・栄養素</u>
・使い捨て包装、食器、カトラリーの再利用に関する法律制定の対象範囲に関する調査</td><td><u>Electronics and ICT　エレクトロニクスとICT</u>
・電気製品中の有害物質規制の見直し
<u>Batteries and vehicles　バッテリー・車両</u>
・義務的リサイクル材活用、リサイクル効率向上の検討
<u>Packaging　容器包装</u>
・包装素材の複雑性の改善検討（製品に使われる素材・ポリマーの数も含む）
・EU全域でのラベル付けに関する実現性評価の実施
・PET以外のプラスチック素材から食品接触材へのリサイクルに関する安全規制設定</td><td>（Section 5 and after）
<u>Making Circularity sork for people, regions and cities　市民、地域、都市のための循環型職業創出</u>
・技能支援と雇用創出、循環経済への移行を支援
・地域レベル投資支援のためのEUファイナンス強化
<u>Circularity as a prerequisite for climate neutrality　気候中立性の前提条件としての循環性</u>
・GHG排出削減に対する循環経済の効果を把握するモデルツール</td></tr>
</table>

		4. Less waste, more value 廃棄物削減と価値創出	**Enhanced waste policy in support of waste prevention and circularity　廃棄物発生抑制と循環を支援する廃棄物政策の拡張** ・2030年までにリサイクルされない一般廃棄物を半減 ・調和のとれた廃棄物の分別収集システム ・消費者関与のため、ビンの色、廃棄物の種別表示の共通化や経済的手法など	**Enhancing circularity in a toxic-free environment　無毒性環境での循環性向上** ・廃棄物の高度分別と汚染物質除去方法の開発を支援 **Creating a well-functioning EU market for secondary raw materials　二次原材料のための機能的なEU市場創出** ・製品中のリサイクル材に関する要件を導入し、二次原材料の需給ミスマッチの解消、リサイクル材市場の拡大につなげる。 ・特定の廃棄物について、全EUレベルの「廃棄物の終了」基準を設定。標準化の役割の強化。 **Addressing waste exports from the EU　EUからの廃棄物輸出対策** ・EUから廃棄物課題を輸出しない方針。EUでのリサイクル。		**Getting the economics right　経済を正しく** ・税制、金融、非財務報告など **Driving the transition through research, innovation and digitalisation　研究、イノベーション、デジタル化を通じた移行推進** － Horizon Europe **Leading efforts at global level　グローバルレベルでの取組主導** ・プラスチックに関する世界的合意に向けた国際努力を主導 ・グローバルサーキュラーエコノミーアライアンスの提案

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