

# Situation of plastic resource circulation in the food industry

October 2018

Food Industry Affairs Bureau  
**Ministry of Agriculture,  
Forestry and Fisheries**

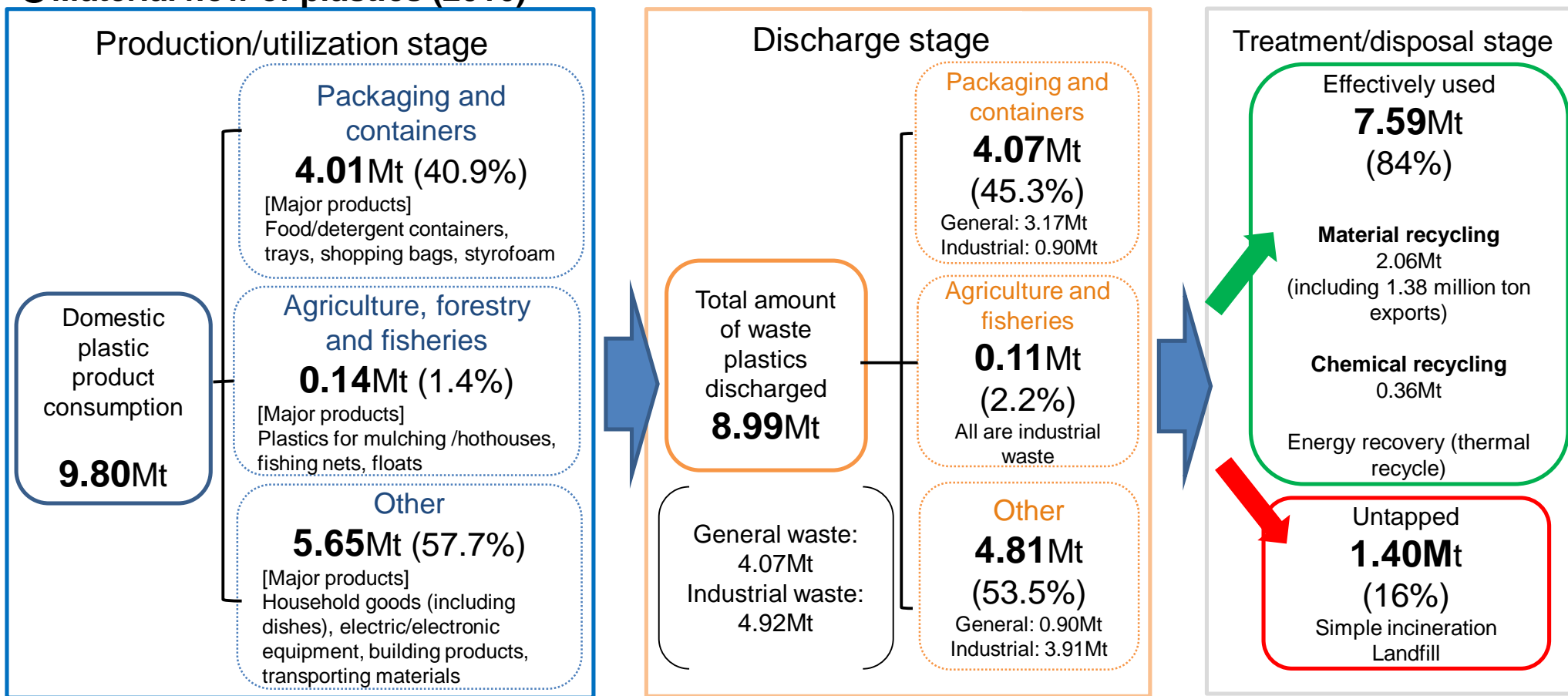
1. Plastics and the food industry
2. Problems surrounding plastics
3. Efforts by the food industry
4. Consumer awareness
5. Future direction

# 1. Plastics and the food industry

## (1) Production, discharge and treatment of plastic in Japan

- Annually about 9 million tons of plastics are discharged in Japan (plastics from the food industry are included in “packaging and containers” and “other.”)
- 84% of the discharged plastics are effectively used, including thermal recycling. Worldwide, 14 to 18% of waste plastics are recycled, 24% is incinerated and the rest is illegally dumped or incinerated (from the material of the Ministry of the Environment, “Report on recycled plastics market by the Environment Policy Committee, Environment Directorate, OECD, in May 2018”)

### ○Material flow of plastics (2016)



Source: Material of the Plastic Waste Management Institute

# 1. Plastics and the Food Industry

## (2) Major plastic products used in the food industry

- Due to its characteristics, such as (1) being lightweight and hardly suffering damage, (2) easy to process and color, and (3) hardly absorbing water and oxygen, which is advantageous for the preservation of food, plastic products are widely used in the food industry
- Among the products, general waste of packaging/containers (with ●) are subject to separate collection by municipalities and recycled by recycling businesses paid by the production/utilization businesses based on the Containers and Packaging Recycling Act (discussed later)
- Products **in red** are more likely to be thrown away because they are frequently carried around.

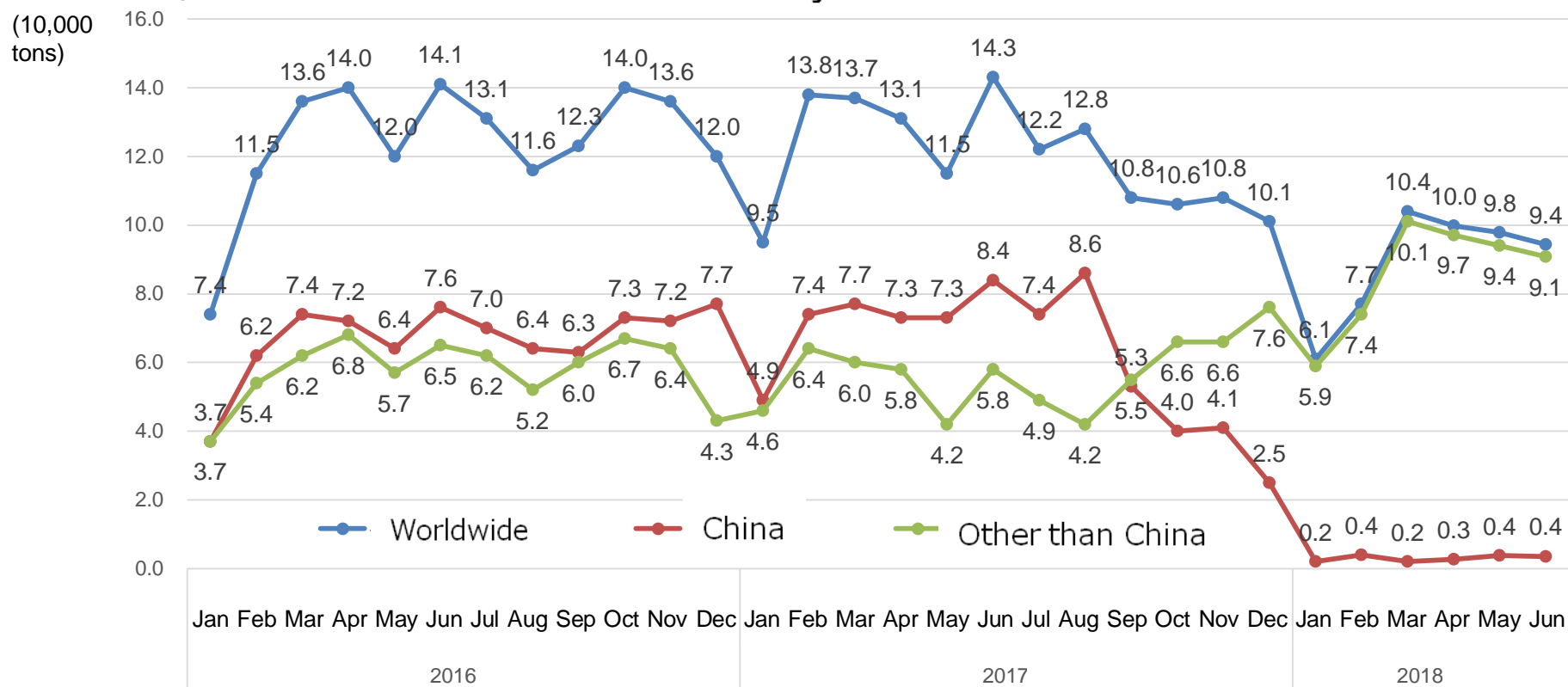
	Not repeatedly used	Repeatedly used
Food production (including ready-made meals)	<ul style="list-style-type: none"> <li>● <b>Food packaging and containers (also used for outdoor eating/drinking)</b></li> <li>● Food packaging and containers (other than above)</li> <li>● <b>PET bottles</b></li> <li>● Buffer</li> <li>● Banding bands</li> <li>● Gloves and other sanitary goods</li> </ul>   	<ul style="list-style-type: none"> <li>● Containers/packaging for raw materials (plastic tanks)</li> <li>● Cooking devices</li> <li>● Cleaning utensils</li> <li>● Pallets</li> <li>● Containers</li> </ul>   
Distribution (wholesale and retail)	<ul style="list-style-type: none"> <li>● <b>Plastic shopping bags</b></li> <li>● <b>Lunch/prepared food containers</b></li> <li>● Trays</li> <li>● Styrofoam</li> <li>● Buffer</li> <li>● Banding bands</li> <li>● <b>Cutlery</b></li> </ul>   	<ul style="list-style-type: none"> <li>● Pallets</li> <li>● Containers</li> <li>● Cleaning utensils</li> </ul>  
Food service	<ul style="list-style-type: none"> <li>● <b>Straws</b></li> <li>● <b>Cups and covers</b></li> <li>● <b>Cutlery</b></li> <li>● <b>Takeout food containers (including bags)</b></li> <li>● Gloves and other sanitary goods</li> </ul>   	<ul style="list-style-type: none"> <li>● Service tray</li> <li>● Dishes</li> <li>● Cooking devices (bowl, etc.)</li> <li>● Cleaning utensils</li> </ul>  

## 2. Problems surrounding plastics

### (1) China's ban on waste plastic import

- China used to import a large amount of waste plastics from many countries, including Japan, for recycling but environmental problems accompanying the practice came to the surface.
- In July 2017 the Chinese government gave WTO a notice that the country would stop import of non-industrial waste and implemented the import ban at the end of December of the same year.
- Because bale flakes of non-industrial waste plastics cannot be exported to China, its export to third countries has increased, but the export does not cover the decrease caused by the ban. In addition, these countries are also moving toward import restriction.
- Development of a domestic resource circulation system is a pressing issue. The MOE established an emergency budget support system (November 2017).

### 1. Plastics and the food industry





## 2. Problems surrounding plastics

### (2) Marine plastic problem ①

#### 1. Drifted waste on the beach



Tobishima, Sakata  
(Yamagata)



Tsushima (Nagasaki)

#### 2. Driftage examples



Fishing  
gear



Plastic tank



Detergent container

#### 3. Assumed damage

- Impact on the marine environment including ecosystem
- Obstruction to ship navigation
- Impact on tourism and fisheries
- Impact on the living environment in coastal zones

→ In recent years there are concerns about the impact of microplastics\* on the ecosystem.

\*tiny plastic waste smaller than 5mm in diameter



Impact on marine organisms



A pile of plastic bags  
found in the stomach  
of a whale

Source: Thai Ministry of Natural  
Resources and Environment



Microbeads



Tiny pieces of plastic

## 2. Problems surrounding plastics

### (2) Marine plastic problem ②

- The breakdown of the amount of plastic waste inputs from land to the ocean (2010 estimates) based on population density, economic conditions and other factors shows that the top four countries are in east and southeast Asia.
- In a monitoring survey of drifted waste conducted by MOE, the countries of manufacture of collected drifted PET bottles were extrapolated. Foreign PET bottles were found at all 10 places and accounted for more than 40% at 5 places. Their ratio was 20% or lower in Nemuro, Hakodate, and Kunisaki, where Japanese products accounted for 50 to 70%.

### ○ Ranking of plastic waste inputs from land to the ocean (2010 estimates)

No.1 China: 1.32-3.53Mt / year  
 No.2 Indonesia: 0.48-1.29Mt / year  
 No.3 Philippines: 0.28-0.75Mt / year  
 No.4 Vietnam: 0.28-0.73Mt / year  
 No.5 Sri Lanka: 0.24-0.64Mt / year

No.20 the USA: 40,000-110,000t / year

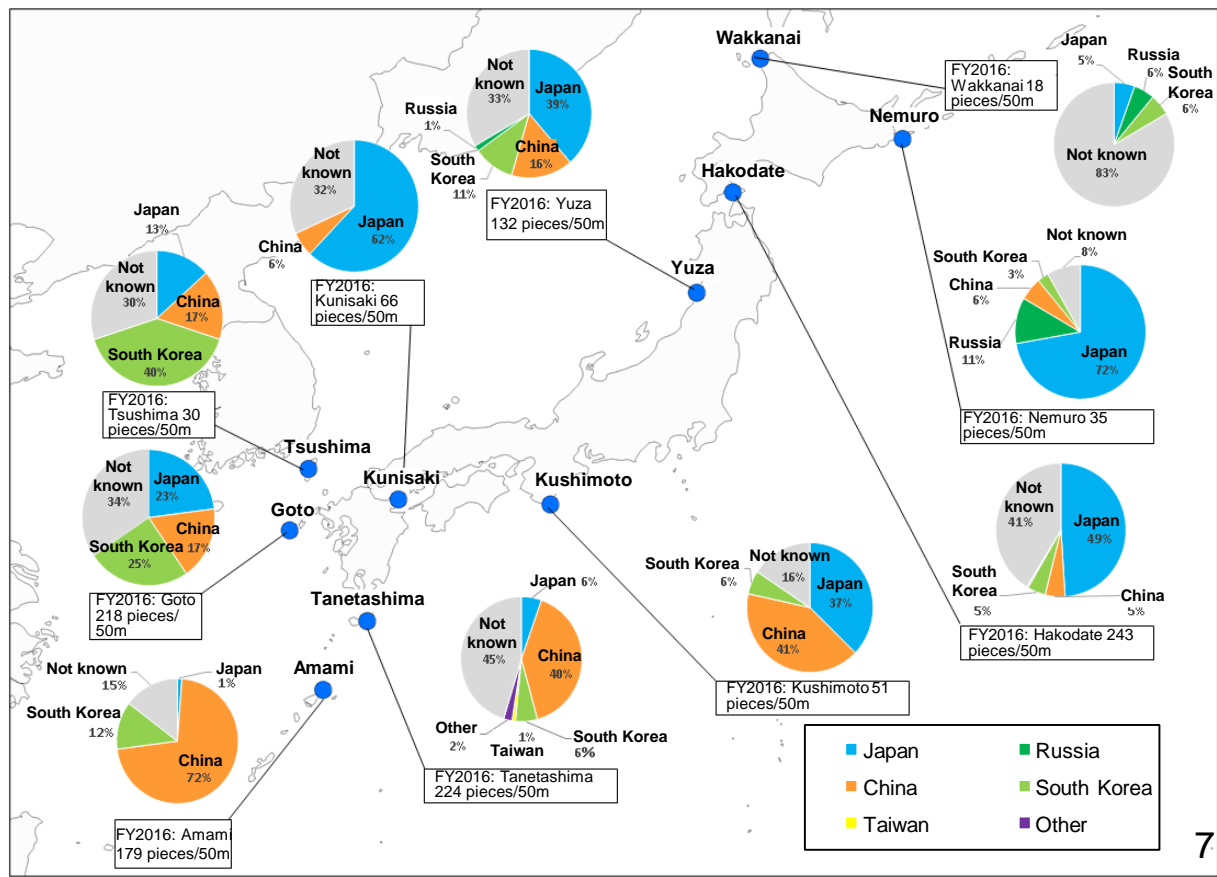
No.30 Japan: 20,000-60,000t / year

Reference: Plastic waste inputs from land into the ocean (Feb. 2015. Science)

Source: MOE material

### ○ Survey of sea garbage by MOE

#### Ratio of drifted PET bottles by the country of manufacture (FY2016)

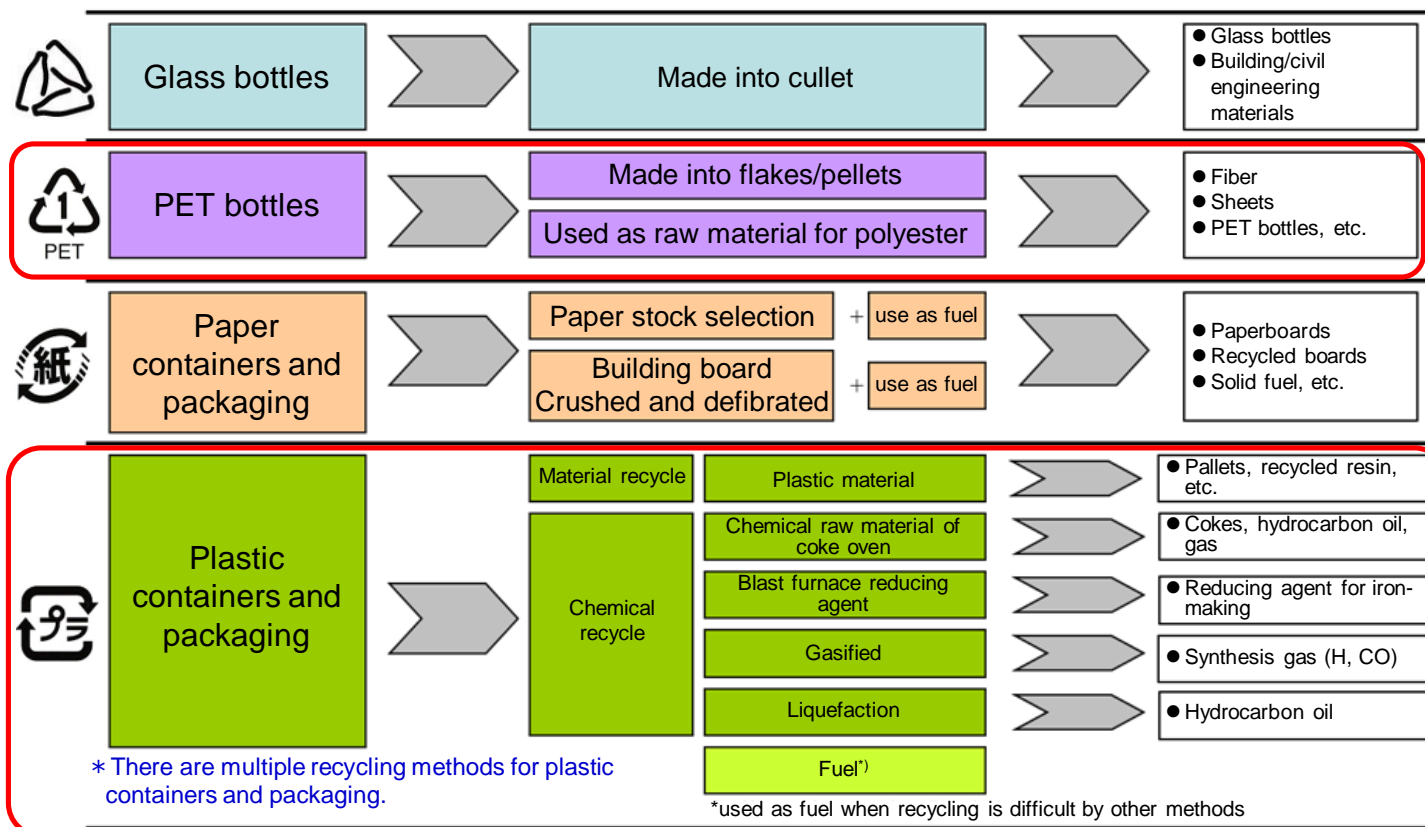


### 3. Efforts by the food industry

#### (1) Containers and Packaging Recycling Act (Act on the Promotion of Sorted Collection and Recycling of Containers and Packaging)

- For plastic containers/packaging, PET bottles and other containers and packaging that can be used as recycled resources, (1) sorted collection by municipalities and (2) recycling by business operators are promoted based on the Containers and Packaging Recycling Act (established in 1995 and partially revised in 2006)
- The act places extended producer responsibility also on business operators using containers/packaging (food industry, etc.) They fulfill their obligation to recycle the containers/packaging collected by municipalities (by paying recycling costs, for example)

#### ○ Recycling of containers/packaging



#### ○ Division of roles

	Role
Consumers	Separate discharge based on the rules of the municipality
Business operators (Manufacture, use or import of containers/packaging)	Recycling container/packaging wastes that are separately collected by municipalities on their own or through a designated corporation or recycler
Municipalities	Separate collection of container/packaging waste

Source: The Japan Containers And Packaging Recycling Association



### 3. Efforts by the food industry

#### (2) Voluntary action plan

- Liaison Committee of Associations Promoting the 3Rs was set up by eight recycling promoting organizations (glass bottles, PET bottles, paper containers/packaging, steel cans, aluminum cans, paper containers for beverage and corrugated boards) in December 2005 with the aim of contributing to society through information exchange among the member organizations.
- Association compiled the goals and content of reduce, reuse, and recycling efforts made by business operators and efforts for cooperation with consumers, NPOs, and governments in the “Voluntary Action Plan for Promotion of 3Rs of Containers and Packaging.” In June 2016 the third Voluntary Action Plan for FY2020 was announced.
- The reduction of PET bottles and plastic containers/packaging has been steadily advancing and its goals were revised upward. Recycling is also making steady progress.

#### ○ Outline of the voluntary action plan of the Liaison Committee of Associations Promoting the 3Rs

##### Voluntary targets

##### Reduce

- Promote Design for Environment of c/p
- Reduce use through weight reduction/thinning
- Develop refilling containers, etc.
- Promote proper use of composites

##### Reuse

- Maintain the glass bottle reuse system

##### Recycle

- Improve or maintain recycling /collection rates
- Recycling suitability, etc.
- Promote design for environment
- Secure diverse collection routes
- Information sharing and cooperation with relevant entities

#### ○ Reduction targets and results

Material	FY2020 target (from FY2004)	FY2016 result	Cumulative reduction since FY2006	Remarks
PET bottles	Reduce average weight of a bottle by 25%	23%	843,000 t	Upward revision from 20% to 25%
Plastic containers/packaging	Reduction rate: 16%	15.3%	82,000 t	Upward revision from 15% to 16%

#### ○ Recycling targets and results

Material	Indicator	FY 2020 targets	FY2016 results
PET bottles	Recycling rate	85% or higher	83.9%
Plastic containers/packaging	Recycling rate	46% or higher	46.6%

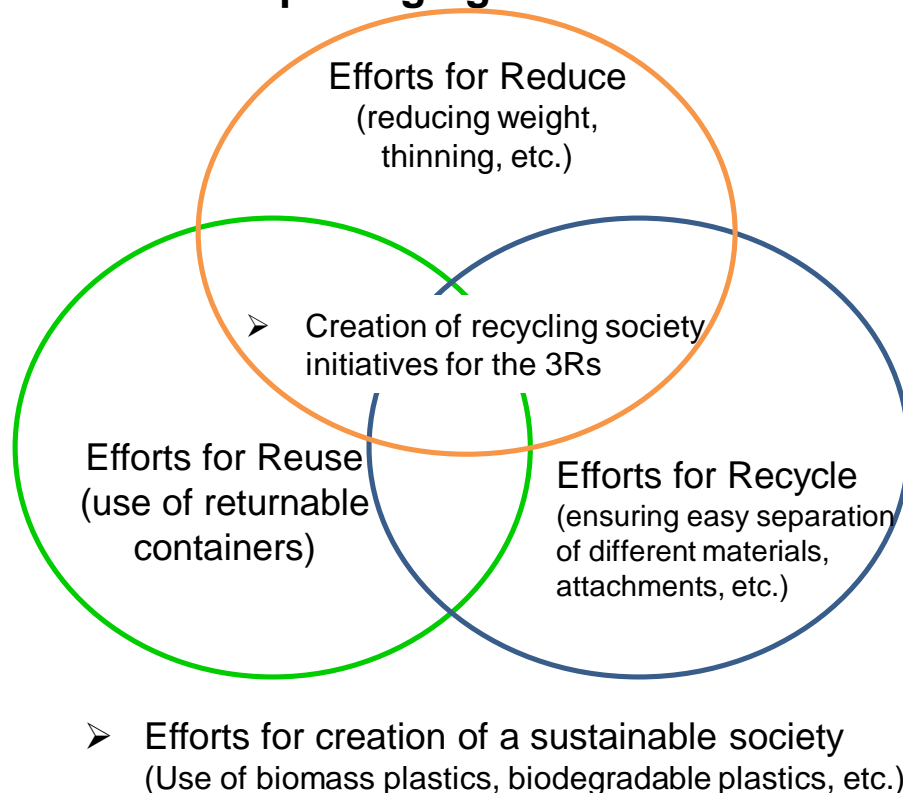
Note: PET bottle Denominator: domestic sales (shipment + import)  
Numerator: domestic and overseas amount recycled  
Plastic c/p Denominator: discharge estimated by JCPRA  
Numerator: Recycled amount, voluntary collection, etc.

### 3. Efforts by the food industry

#### (3) Design for Environment of containers and packaging

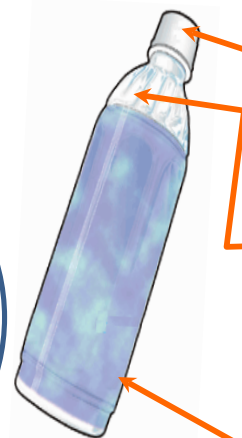
- 3R-promoting organizations and businesses producing or using containers/packaging are implementing design for an environment of containers/packaging to promote reduce, reuse and recycling.
- For example, changing PET bottles to c/p easy to separate and recycle contributes to raising the collection rate and improving the quality of recycled acrylic resin.

#### ○Concept of Design for Environment of containers/packaging



#### ○Guideline for voluntary design of PET bottles

**Soft drinks (including milk beverage), specified seasoning (soy sauce, etc.)**



**Cap → plastic cap**  
(PE/PP= specific gravity is under 1 (floats on the water))  
1998: aluminum caps were banned

**Bottle body: colorless and transparent simple PET**  
1998: Base cups were prohibited in principle  
2001: Colored bottles were prohibited.  
2015: Guidelines for BtoB were added

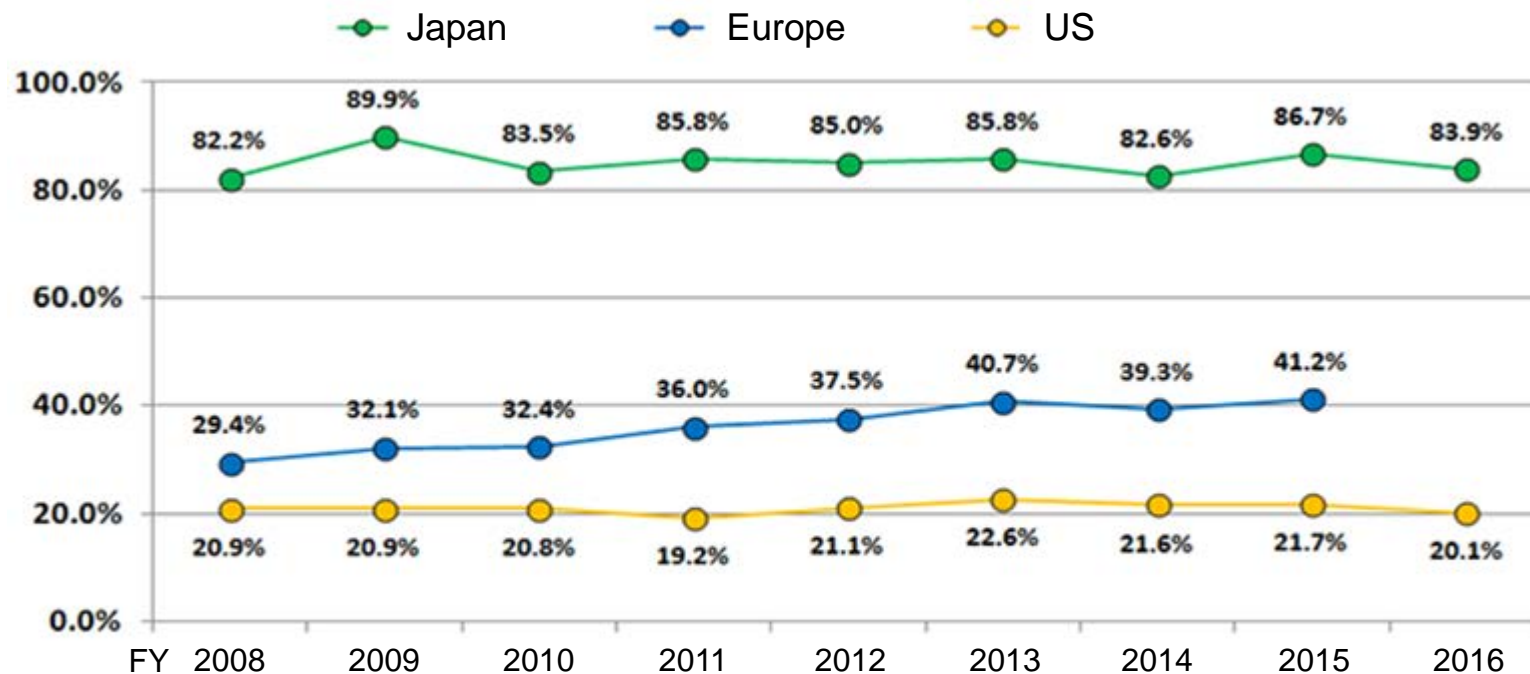
**Labels should be easy to peel by hand**  
1994: Polyvinyl chloride was banned  
(to prevent discoloring of the recycled material)  
1994: Full pasting of paper label was prohibited  
1998: Aluminum laminating was prohibited.

Reference: "Handbook for Design for Environment of Packaging conforming to JIS" METI

### 3. Efforts by the food industry

#### (4) Comparison of PET bottle recycling in Japan, the United States and Europe

##### ○Changes in PET bottle recycling rate in Japan, the United States and Europe



		2008	2009	2010	2011	2012	2013	2014	2015	2016
Japan	Recycling rate (%)	82.2%	89.9%	83.5%	85.8%	85.0%	85.8%	82.6%	86.7%	83.9%
	Collection rate (%)	77.7%	77.4%	72.2%	79.6%	90.5%	91.3%	93.5%	92.4%	88.9%
	Sales (1000t)	573	565	596	604	583	579	569	563	596
Europe	Recycling rate (%)	29.4%	32.1%	32.4%	36.0%	37.5%	40.7%	39.3%	41.2%	
	Collection rate (%)	46.0%	48.4%	48.3%	51.0%	52.3%	55.9%	57.2%	59.1%	
	Sales (1000t)	2,733	2,816	3,004	3,109	3,204	2,935	3,062	3,119	
US	Recycling rate (%)	20.9%	20.9%	20.8%	19.2%	21.1%	22.6%	21.6%	21.7%	20.1%
	Collection rate (%)	27.0%	28.0%	29.1%	29.3%	30.8%	31.2%	31.0%	30.1%	28.4%
	Sales (1000t)	2,434	2,336	2,427	2,485	2,534	2,615	2,653	2,708	2,800

Note: The Council for PET Bottle Recycling recalculated the recycling rate using PET bottle sales as denominator.

Original data: NAPCOR for the US, PETCORE for Europe, and the Council for PET Bottle Recycling for Japan

### 3. Efforts by the food industry

#### (5) Efforts for environment beautification

- Many businesses in the food industry engage in cleaning activities around their production sites/stores to contribute to the community and preserve the environment, and also participate in environment beautification activities of the community.
- The beverage industry established the Beverage Industry Environment Beautification Association in 1973 in order to jointly address the litter issue.

#### ○ Efforts by business operators

Doutor Coffee  
Co., Ltd.  
Cleaning  
activities around  
Shibuya Station



Nichirei Group  
Love Earth Cleanup  
(Matsubara coast  
cleaning)



Source: Websites of the respective companies

#### ○ The Beverage Industry Environment Beautification Association (BIEBA)

**Six associations of beverage manufacturers established and have been operating BIEBA with the aim of preventing scattering of food containers, working for environment beautification of the national land and thereby contributing to promotion of public welfare (1973-)**

- ◆ Japan Soft Drink Association
- ◆ Japan Tomato Processors Association
- ◆ Japan Fruit Juice Association
- ◆ Coca Cola Association
- ◆ Japan Coffee Beverage Association
- ◆ Brewers Association of Japan

#### ● Activities of BIEBA

- (1) Dissemination, awareness raising and grants for environment beautification
- (2) Survey research on environment beautification
- (3) Collection, analysis and provision of materials and information on environment beautification
- (4) Collaboration/cooperation with public institutions, etc. for environment beautification
- (5) Requests, proposition, etc. for environment beautification to public institutions, etc.
- (6) Other activities necessary to achieve the objectives of the association

#### ● Specific activities

- Adopt program promotion services
- Gathering information on adopt program activities
- Attending events, etc.
- Presenting awards to schools providing outstanding environment beautification education
- Introduction of environment beautification practices
- Developing and creating environmental education guidebooks
- Providing Machi Bika Kids program

Source: Material of Japan Soft Drink Association

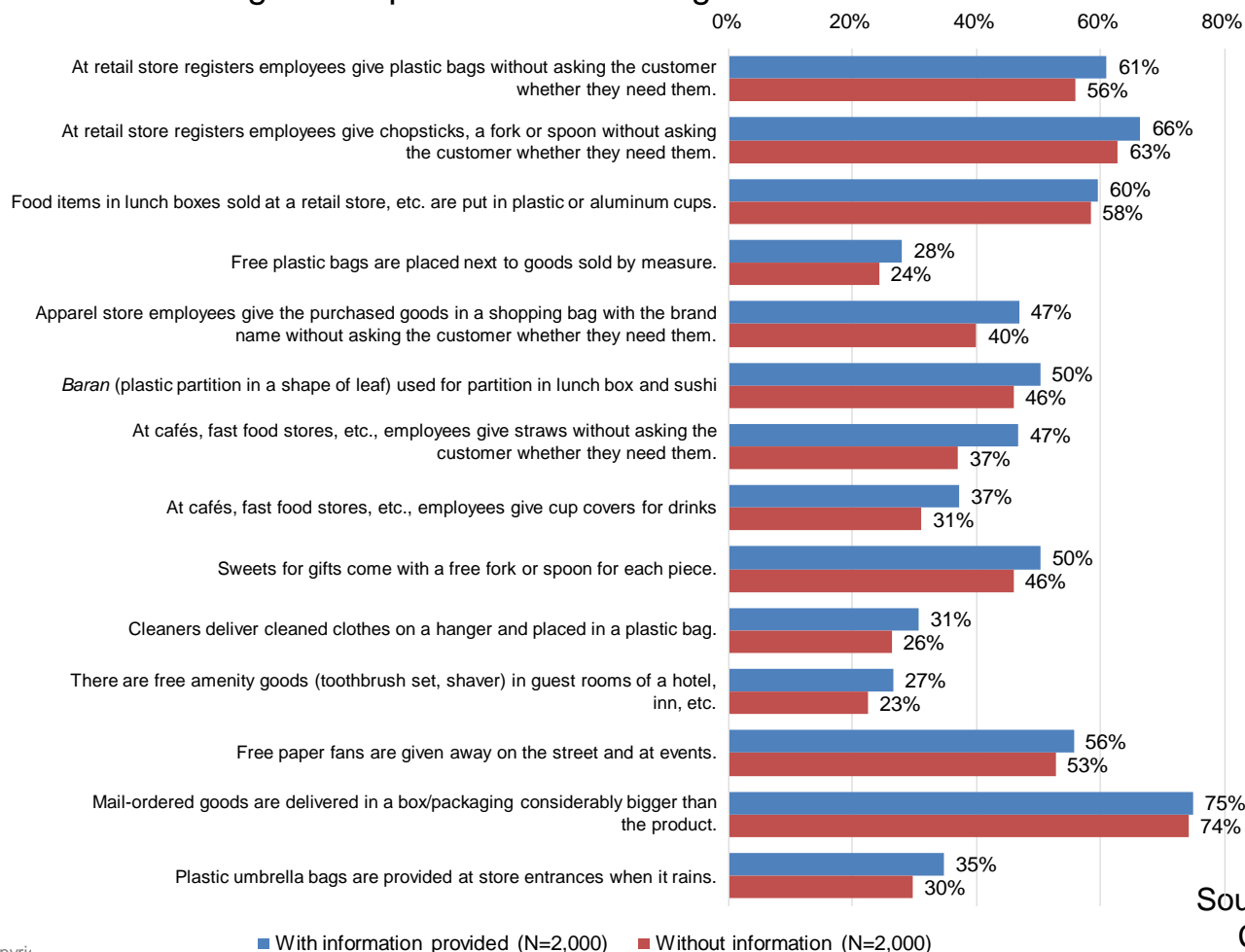
## 4. Consumer awareness

### (1) Citizen survey on various services that use plastics ①

- A questionnaire survey was conducted on consumer awareness about various services using plastics.

- Period: July 27 to 30, 2018
- Method: web survey using the Internet
- Targets: 4,000 men and women in their 20s and older across Japan (half of them gave answers after receiving information on marine plastic problems, etc.)

#### <Percentage of respondents answering that the service is excessive>



- Providing plastic bags, chopsticks, fork and spoon without asking the customer whether they need them, and delivering mail-order goods in a box larger than the product were perceived as excessive by over 60% of the respondents.
- Examples of services not included in the options but perceived excessive were “double (excessive) packaging,” individual packaging of sweets, etc.” and “PET bottle labels.”

Source: MOE material

Created by Mitsubishi Research Institute, Inc.

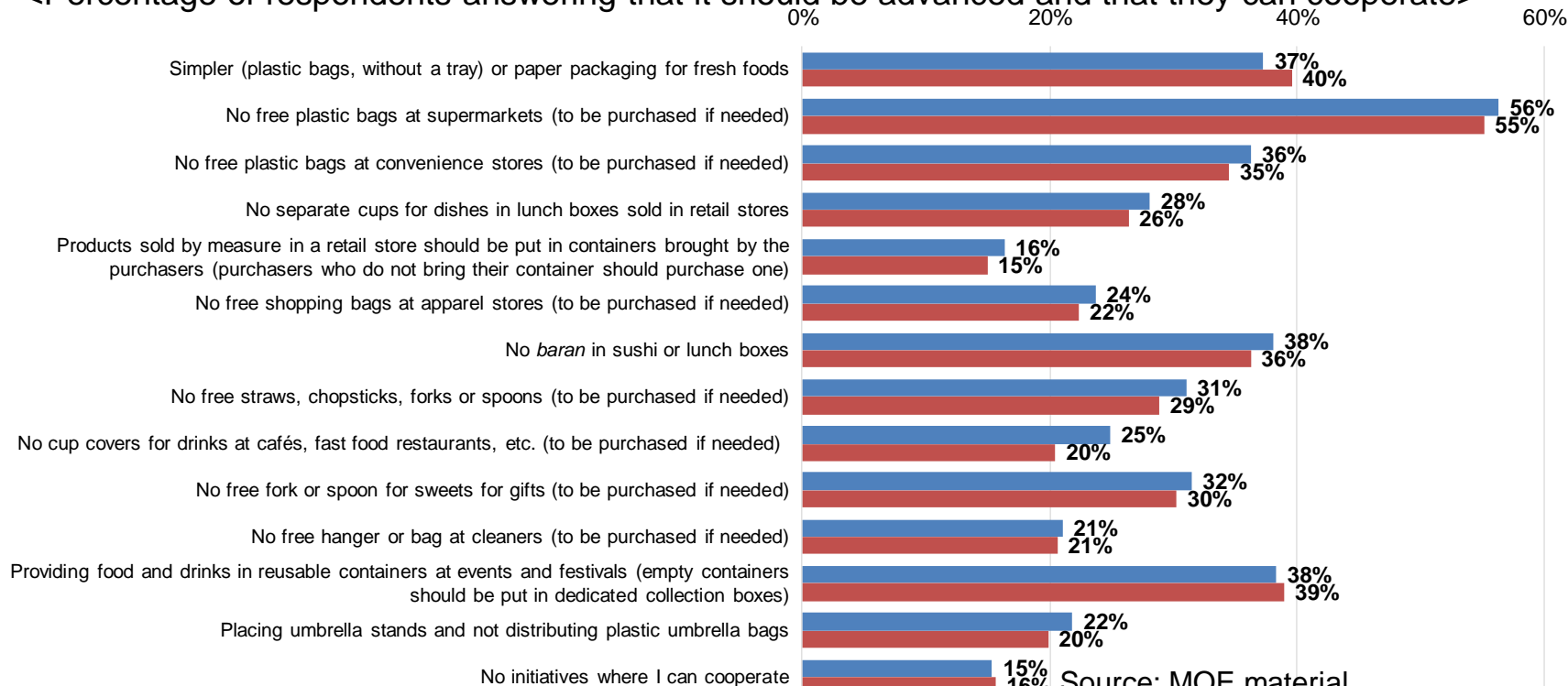


## 4. Consumer awareness

### (1) Citizen survey on various services using plastic ②

- As initiatives that are to be advanced and where they can cooperate, more than 50% of the respondents chose “charging for supermarket plastic bags” followed by “simpler or paper packaging for fresh foods,” “charging for plastic bags at convenience stores,” “disuse of *baran* for sushi and lunch box” and “use of reusable containers in event sites, at 40 to 30%.
- Initiatives that are to be advanced and where they can cooperate, other than the options include:
  - Self-service provision of chopsticks, spoons, forks and cup covers
  - Prohibition of using disposable plastic containers for eating in a restaurant
  - Prohibition of individually packed disposable wet towels
  - Introduction of discount for purchasers who refuse free provision
  - Expansion of convenience stores and vending machines for use of My Bottle

<Percentage of respondents answering that it should be advanced and that they can cooperate>



Source: MOE material

Created by Mitsubishi Research Institute, Inc. 14

## 4. Consumer awareness

### (3) Public awareness of 3Rs of containers and packaging

According to the FY2016 Attitude Survey on 3Rs of Containers/Packaging conducted by the Liaison Committee of Associations Promoting the 3Rs, respondents who don't know about the 3Rs increased by 7% from the previous survey (June 2011). Respondents who practice recycling decreased 7 percentage points.

#### Recognition of the 3Rs

(%)

	Understand the meaning and acting accordingly	Know what the term means	Have heard the term	Don't know
Legend				
Survey in July 2009	9.6	27.0	24.9	38.5
Survey in June 2011	9.8	26.8	22.7	40.7
Survey in September 2016	9.4	23.3	19.7	47.6

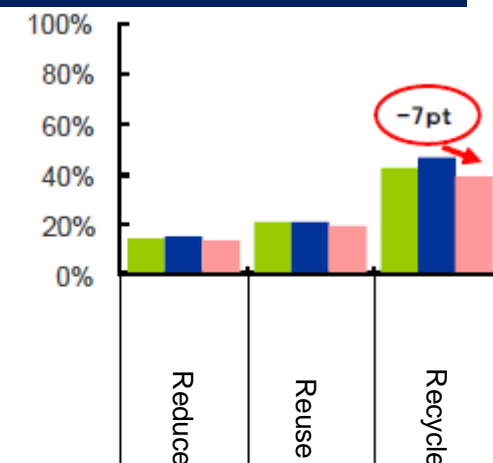
+ 7pt

\*Level of understanding of the term = "Understand the meaning and acting accordingly" and "know what the term means"

\*Recognition of the term= "understanding of the term" + "have heard the term"

Level of the understanding of the word	Recognition of the word
36.6	61.5
36.6	59.3
32.7	52.4

#### Respondents who are actually doing each of the 3Rs



Legend

Survey in July 2009	14.7	20.7	42.9
Survey in June 2011	14.9	21.1	46.5
Survey in September 2016	13.9	19.3	39.1

- ◆ Survey method: Internet research
- ◆ Survey area: nationwide
- ◆ Targets: men and women aged 15 to 69 (chosen based on the population composition)
- ◆ Number of valid responses: 3,000 samples
- ◆ Survey period: September 9-11, 2016
- ◆ Planned by: Liaison Committee of Associations Promoting 3R
- ◆ Carried out by: Cross Marketing Inc.

Source: website of the Liaison Committee of Associations Promoting the 3Rs

## 5. Future direction

### (1) Global trends in plastic problems ①

#### Sustainable Development Goals (SDGs)(2015.9)



- As one of the targets of SDGs, UN set forth “By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and ... Index of coastal eutrophication and floating plastic debris density

#### G7

##### <G7 Ise-Shima Summit (May2016)>

- Leaders’ declaration includes: We reaffirm our commitment to address marine litter, recognizing that our efforts on resource efficiency and the 3Rs also contribute to the prevention and reduction of marine litter, particularly plastic, from land-based sources.

##### <G7 Charlevoix Summit (June 2018)>

- All G7 countries approved the “Charlevoix Blueprint for Healthy Oceans, Seas and Resilient Coastal Communities” on preservation of marine environment and included “will improve oceans knowledge, promote sustainable oceans and fisheries, support resilient coasts and coastal communities and address ocean plastic waste and marine litter” in their communique.
- Canada and European countries endorsed Ocean Plastics Charter (including numerical targets with completion dates)
- Prime Minister Abe announced that G20 would be chaired next year by Japan, which would continue to address the problems.

#### UN Environment Assembly (UNEA3)(2017.12)

- Adopted the Resolution on Marine Litter and Microplastics and decided to call an expert group to further examine the barriers to and options for combating marine plastic litter. Its first meeting was held in May.

#### G20

##### <G20 Hamburg Summit(July 2017)>

- The first G20 Summit to take up the marine litter problem in leaders’ declaration
- Based on the initiatives of the past G7s, the G20 agreed to set up the G20 Action Plan on Marine Litter, which incorporates waste prevention, establishment of sustainable waste management, research, etc.

#### Tripartite Environment Ministers Meeting (TEMM20) (2018.6)

- Exchanged frank views on measures against marine litter including microplastics. Japan, China and South Korea shared the recognition that the marine plastic problem is a common global challenge.
- Toward G20 Summit and ministers’ meeting to be held in Japan in 2019, the three countries confirmed their cooperation.

Note: China banned import of non-industrial waste plastics at the end of 2017 and industrial waste plastics at the end of 2018.

## 5. Future direction

### (1) Global trends in plastic problems ②

#### OG7 OCEAN PLASTICS CHARTER (Committed to by the leaders of Canada, France, Germany, Italy, UK and EU)

##### 1. Sustainable design, production and after-use markets

- Working with industry towards 100% reusable, recyclable, or, where viable alternatives do not exist, recoverable, plastics by 2030.
- Taking into account the full environmental impacts of alternatives, significantly reducing the unnecessary use of single-use plastics.
- Working with industry toward increasing recycled content by at least 50% in plastic products where applicable by 2030
- Working with industry toward reducing the use of plastic microbeads in rinse-off cosmetic and personal care consumer products, to the extent possible by 2020, and addressing other sources of microplastics
- Using green public procurement and supporting secondary plastics markets, etc.

##### 2. Collection, management and other systems and infrastructure

- Working with industry and other levels of government, to recycle and reuse at least 55% of plastic packaging by 2030 and recover 100% of all plastics by 2040
- Increasing domestic capacity to manage plastics as a resource, prevent their leakage into the marine environment from all sources, and enable their collection, reuse, recycling, recovery and/or environmentally-sound disposal.
- Accelerating international action and catalyzing investments to address marine litter
- Whole supply chain approach, working with relevant partners

##### 3. Sustainable lifestyles and education

- Strengthening standards for labeling to enable consumers to make sustainable decisions on plastics, including packaging.
- Support platforms for information sharing to foster awareness and education efforts
- Supporting industry leadership initiatives, promoting the leadership role of women and youth

##### 4. Research, innovation and new technologies

- Assessing current plastics consumption
- Calling to start G7 Plastics Innovation Challenge
- Guiding the development and appropriate use of new innovative plastic materials
- Promoting the research, Harmonizing G7 science-based monitoring methodologies, fate analysis of plastics

##### 5. Coastal and shoreline action

- Implementing 2018 G7 Action Year to foster public awareness and collect data
- Accelerating implementation of the 2015 G7 Leaders' Action Plan to Combat Marine Litter

## 5. Future direction

### (2) The 4<sup>th</sup> Basic Plan for Establishing the Recycling-Based Society (Cabinet Decision on June 19, 2018)

#### ○Thorough recycling (plastic) throughout the lifecycle (excerpt)

##### Medium- to long-term direction of actions toward formation of recycling-based society

- Maximally restrain discharge of plastics through maximum use of My Bag (individuals' own bags), reduction of one-way containers/packaging and other efforts, while promoting reuse of cups, etc. Properly discharge used plastics without such a negative impact on the environment as marring beauty through littering and illegal dumping and leakage into the sea where they would become microplastics. Carry out high-quality recycling to ensure high demand and good prices of the recycled materials in the market for repeated recycling.
- Incinerate plastics that have to be incinerated and plastics from biomass that will be increasingly used ensuring heat recovery. Use biodegradable plastics for agricultural sheets, food waste collection bags and other uses where decomposition is desirable.
- Through these efforts, ensure the 3Rs of plastics, reduction of GHG emission, dependency on fossil resources, impact on marine environment, etc., whereby vitalizing the resource recycling industries.



- **Formulate a strategy on plastic resource re-circulation for comprehensive promotion of plastic resource circulation.** Its principles will be: establish a domestic recycling system in response to the ban on waste imports by China and other countries while addressing broad challenges including resource/waste restrictions, marine litter and global warming, reduce dependency on non-renewable resources, replace them with renewable resources and ensure thorough collection of used resources for repeated recycling with consideration to economic performance and engineering feasibility in order to realize a sustainable society and pass on a rich environment to the next generations. Promote measures based on the strategy.
- Specifically, comprehensively promote ① **reduction in use of plastics to contribute to the reduction of environmental burden including single-use containers/packaging**, ② **thorough, effective and efficient collection and recycling of used plastics including underused plastics**, ③ **improvement of usefulness of bio plastics and replacement of plastics derived from fossil fuels**



## 5. Future direction

### (3) Key points of plastic resource recycling

It is important to contribute to solutions of the global marine plastic problem by establishing a recycling-based society, and a shift from exhaustible resources to renewable resources and resource recycling based on the Basic Plan for Establishing the Recycling-Based Society

#### [1. Reduce and reuse]

The discharge of containers/packaging per capita is large in Japan. Amid global calls for a large reduction of disposable plastic containers/packaging and products through replacement, avoidance, etc., how should we reduce the use of plastics to contribute to the reduction of environmental footprint?

#### [2. Collection and recycling]

Based on the trend of import bans in Asia and the significant amount of unutilized plastics, how should we conduct thorough, effective and efficient collection, and recycling of used plastics?

#### [3. Use of recycled materials/recyclable resources]

How should we promote the use of recycled materials and recyclable resources, such as biomass plastics, which may include demand expansion, improvement of their usefulness and replacement of plastics derived from fossil resources?

#### [4. Measures to address marine plastics]

Based on the estimation that annually several tens of thousands of waste plastics are flowing out from the land of Japan, how should we prevent the leakage of waste plastics to the sea and address the problem of marine plastics, including driftage.

#### [5. International expansion]

Considering that resource/waste restriction is a global challenge and that the leakage of plastics into the sea is a challenge for the entire world including developing countries, how should Japan internationally expand its initiatives, including international cooperation, in order to lead efforts to address plastic problems around the world?

#### [6. Ocean Plastics Charter]

How should we evaluate and consider the numerical targets with completion dates and various initiatives set forth in the Ocean Plastics Charter?

#### [7. Effects]

How should we produce positive effects, including innovation of technologies and lifestyle, promotion of recycling-related industries and job creation, as well as environmental load reduction through these challenges?