



CLOMA ACTION PLAN

May 2020



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What is CLOMA?



Japan Clean Ocean Material Alliance

Japan Clean Ocean Material Alliance (CLOMA) was established in January 2019, consisting of companies responsible for consumer product supply chains. In order to solve current issues in marine plastic litter, it is necessary to collect plastic litter while also making efforts to prevent more plastics from flowing into the ocean.

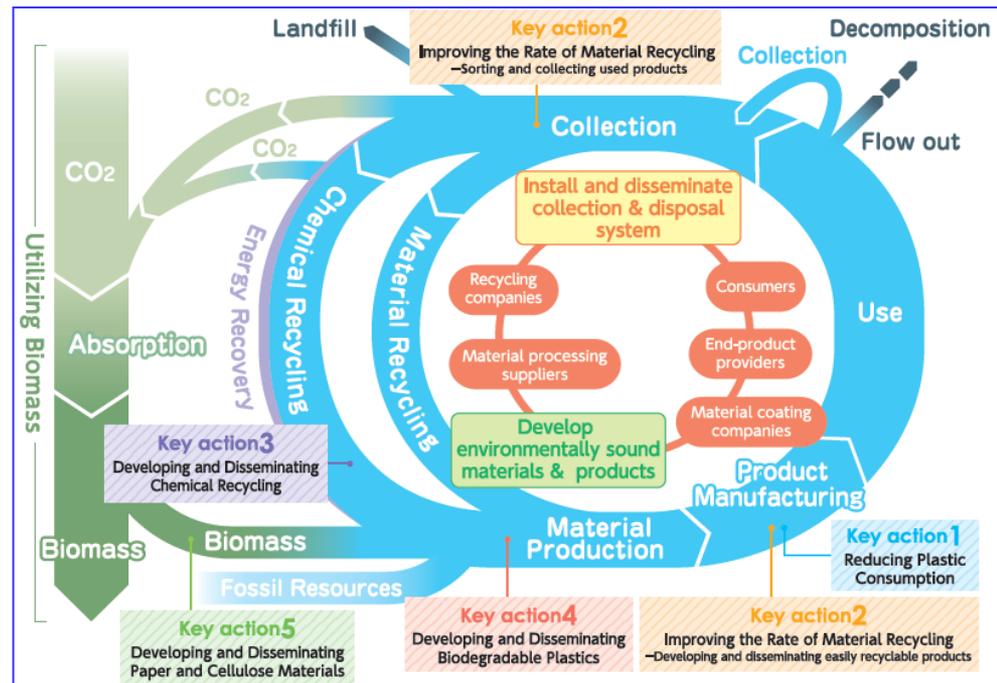
Leveraging the technology and knowhow accumulated by Japan's industrial community, CLOMA endeavors to accelerate innovation for the 3R (reduce, reuse and recycle) and alternative materials, and to encourage extensive plastic recycling through public-private partnerships. In this way, CLOMA will disseminate its "Japan model," a made-in-Japan solution that aims to reduce marine plastic litter to zero in cooperation with consumers and society.



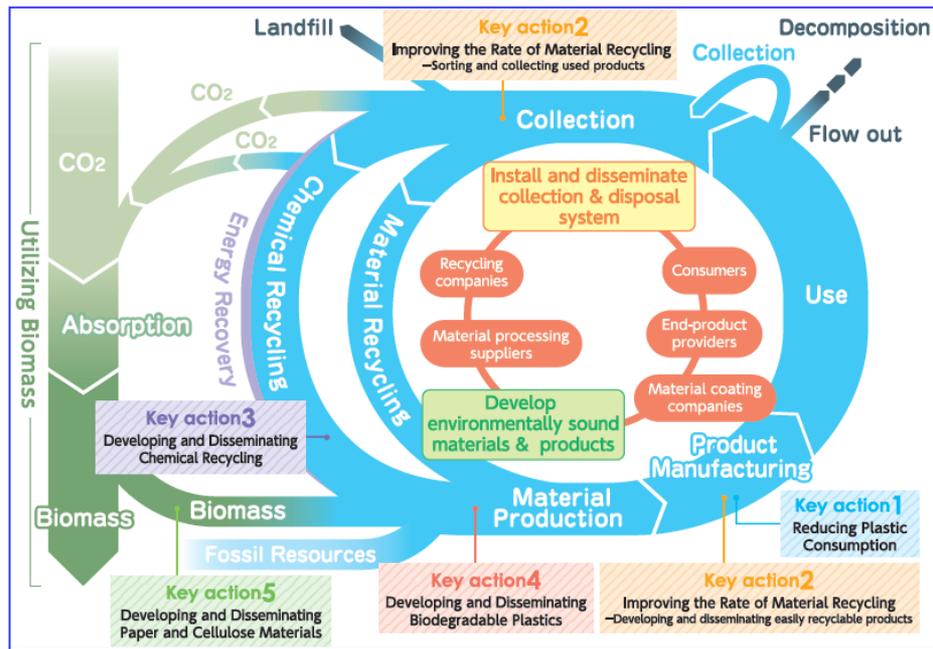
CLOMA Principles

To solve the marine plastic litter problem, it is essential to ensure the thorough collection and disposal of used plastic products. In addition to this, it is also important to promote developing, manufacturing and using environmentally sound plastic products, and using alternatives that are environmentally sound materials/products.

- 1 We will contribute to the attainment of SDGs and clean ocean through the development, production and use of materials and products.
- 2 We will proceed with the following goals as two wheels: thoroughly implement proper collection and disposal of used plastic products, while deepening efforts on the 3Rs and using alternatives that are environmentally sound materials/products.
- 3 We will share technology, knowhow and experiences among our members at the maximum level, and create larger-scale innovations including new business models.
- 4 We will optimize the combination of technology development and social systems, and gain understandings from stakeholders to accelerate social implementation.
- 5 We will disseminate a "Japan model" to the world which enables circular use of materials and reduction of environmental load by accommodating our model to the situation and needs of each country.



Basic Concepts for CLOMA's Direction



Improving and promoting the 3R

Reducing plastic consumption
Product specifications:

- New container and packaging designs
- Material development

Extensive recycling

Methods for recycling plastic resources:

- Improving the rate of material recycling
- Promoting the use of chemical recycling
→ Reducing energy recovery

Utilizing alternative materials

- Biodegradable plastics
- Paper and cellulose materials
(including composite materials containing biodegradable plastics)

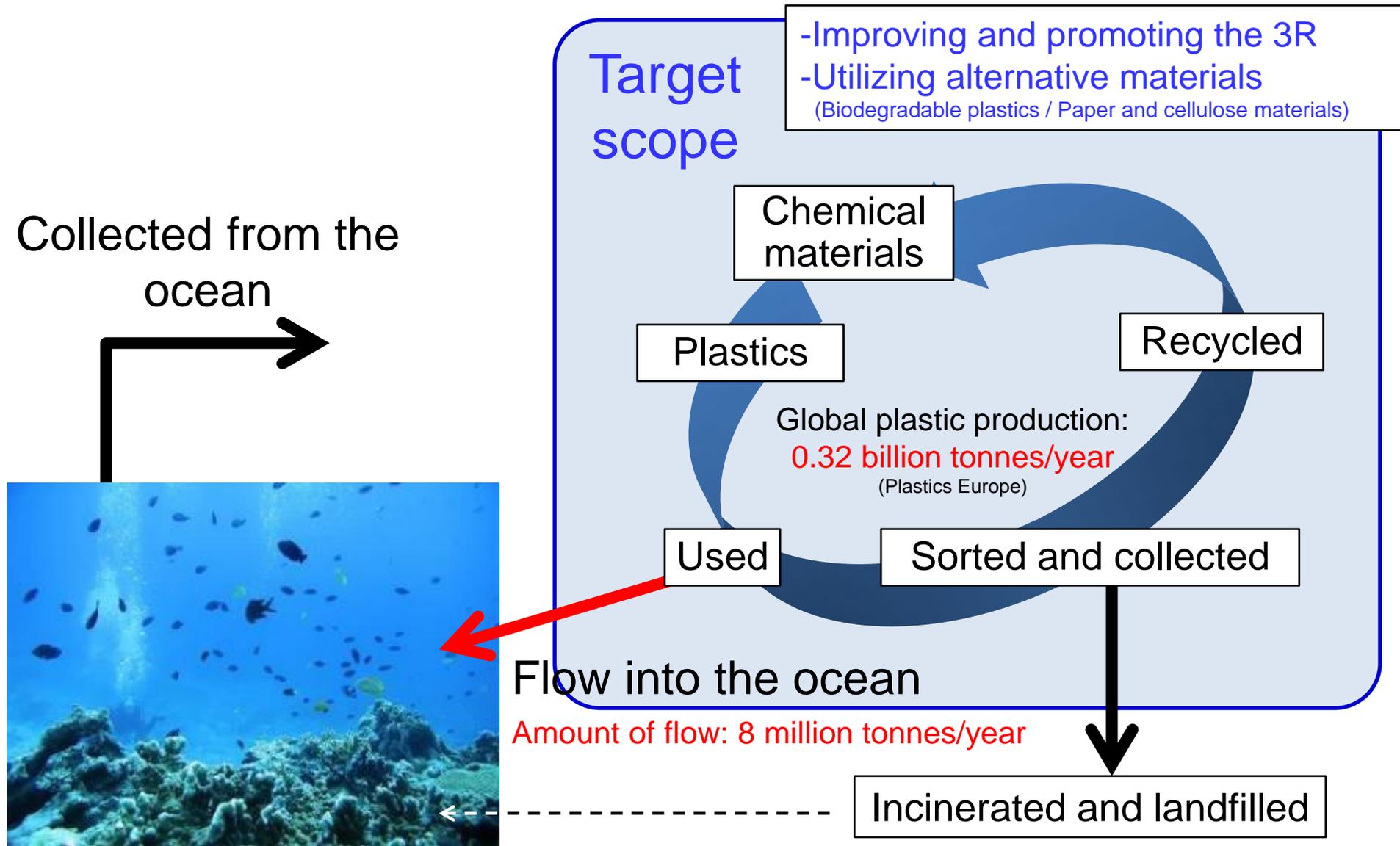
Constructing a recycling infrastructure

- Establishing a system for sorting and collecting plastic waste

➔ **CLOMA ACTION PLAN**

2. CLOMA ACTION PLAN

Fields Benefiting from the CLOMA ACTION PLAN

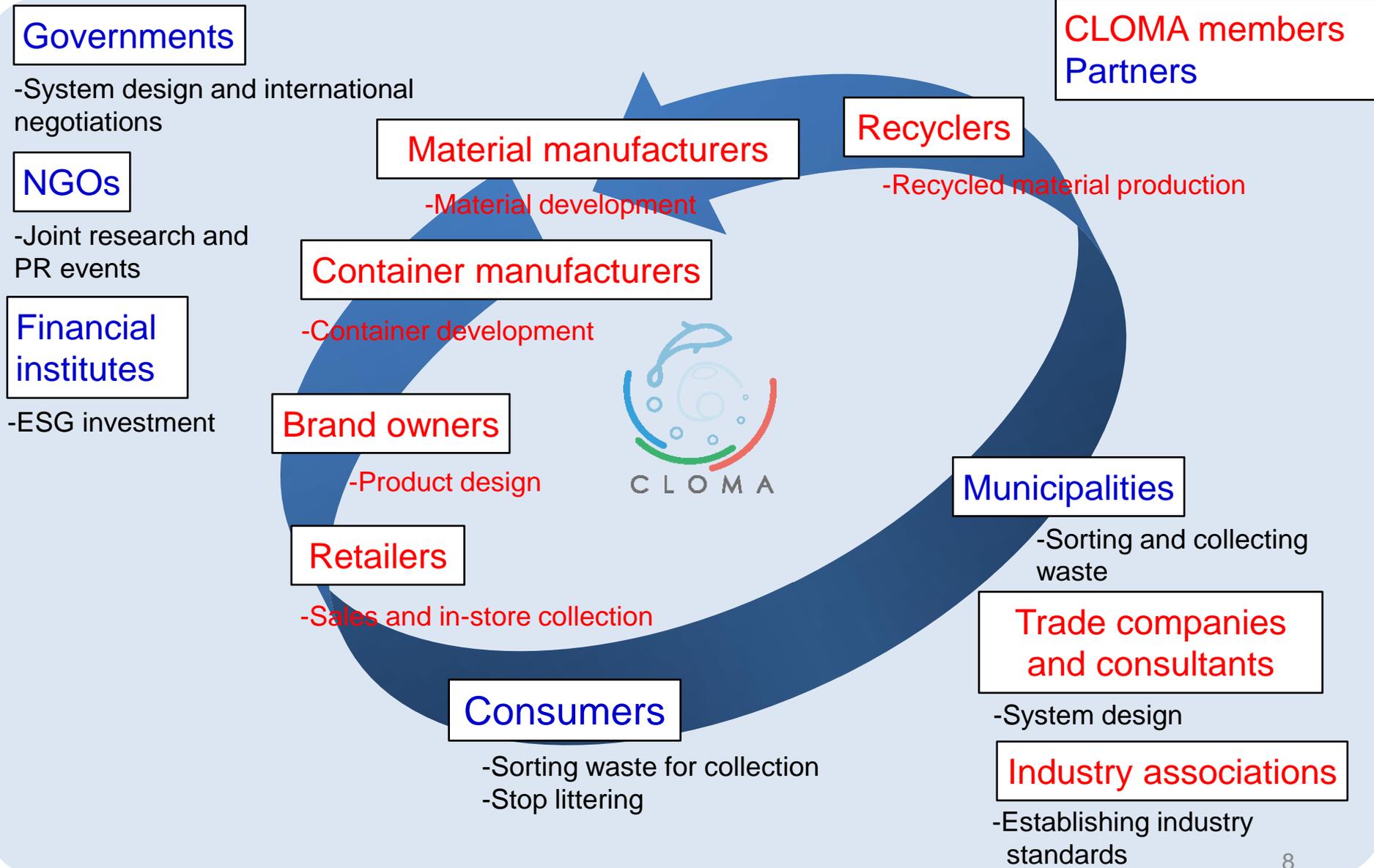


Accumulated amount: 0.15 billion tonnes

New Plastic Economy (Ellen MacArthur Foundation)

Working in Cooperation with Supply Chains

A wide range of partnerships with consumers, governments, NGOs, etc.





CLOMA ACTION PLAN: Key Message

CLOMA aims to achieve 100% recycling of plastic products such as containers, packaging and others by 2050 to contribute to reducing marine plastic litter.



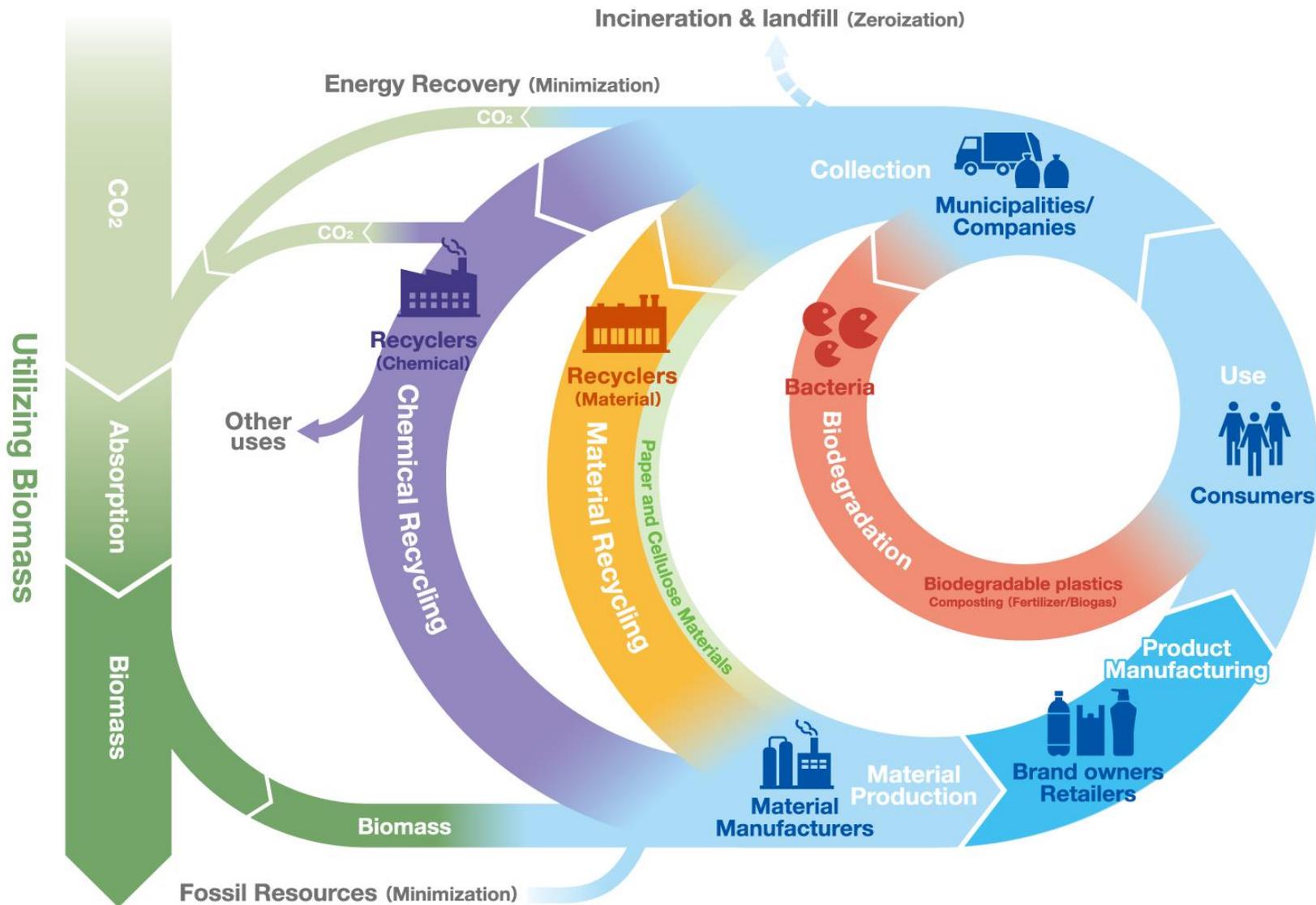
Overview of the CLOMA ACTION PLAN

	2030	2050
Worldwide	SDG14: LIFE BELOW WATER	Osaka Blue Ocean Vision Reduce additional pollution of marine plastic litter to zero
Japan Plastic Material Cycle Strategy	2025: Reusable/recyclable design 2030: Cumulative 25% reduction in single-use plastic waste 60% recycling/reusing for containers and packaging Double the use of recycled material Introduce approx. 2 million tonnes of biomass plastics 2035: 100% effective utilization of used plastics	
CLOMA ACTION PLAN	60% recycling of containers/packaging*	100% recycling of plastic products**
Key action 1: Reducing	25% reduction in virgin plastic waste	Maximum utilization
Key action 2: Material Recycling	PET: 100% collection, extensive recycling (100% effective utilization***) Other plastics: 60% recycling	
Key action 3: Chemical Recycling		
Key action 4: Biodegradable Plastics	Helping to introduce 2 million tonnes of biomass plastics	
Key action 5: Paper and Cellulose	0.1 million tonnes of alternative materials to replace plastics	

* Recycling: Material recycling + Chemical recycling
 ** Plastic products: Containers, packaging, cutlery, fishing tools, etc.
 *** Effective utilization: Recycling + Energy recovery

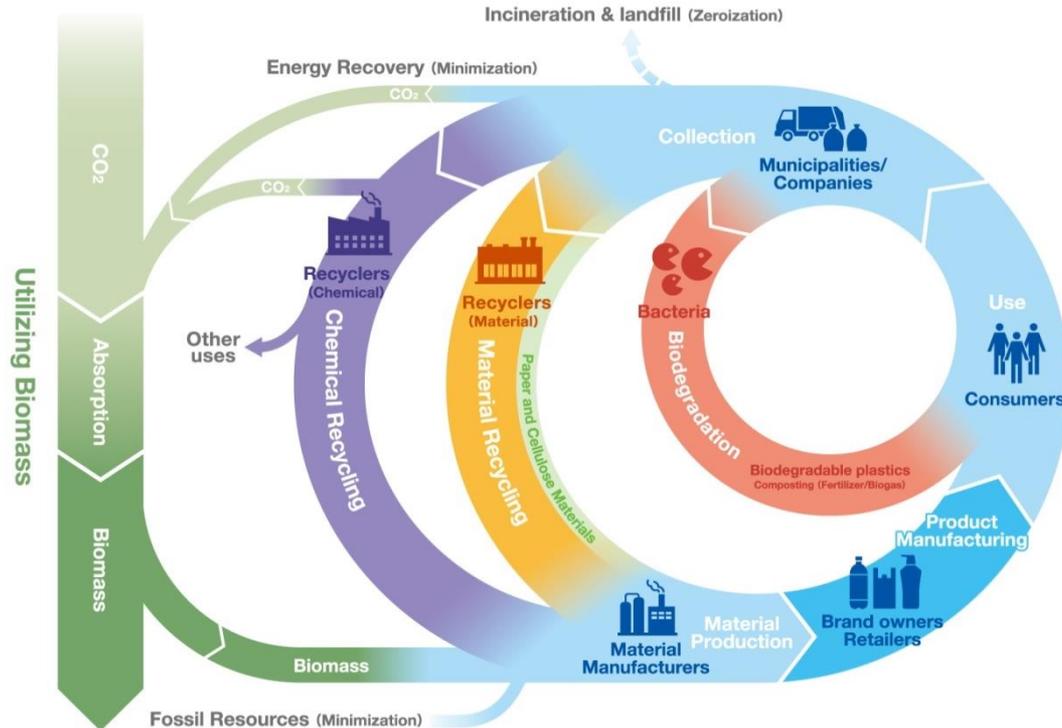
Goal in 2050

Aiming for 100% recycling



What Are the 5 Key Actions?

Aiming for 100% recycling



Key action 1

Key action 2

Key action 3

Key action 4

Key action 5

Cross-action theme

Reducing Plastic Consumption

Improving the Rate of Material Recycling

Developing and Disseminating Chemical Recycling

Developing and Disseminating Biodegradable Plastics

Developing and Disseminating Paper and Cellulose Materials

Sophisticating the sorting and collection system



Direction for the 5 Key Actions (1/2)

	Direction to aim for	Targets to achieve	Outline of activities
Key action 1 Reducing Plastic Consumption	Reduce unnecessary use of plastics (made from fossil resources)	<ul style="list-style-type: none"> -Reduce waste of virgin plastics made from fossil resources used in containers and packaging by 25% by 2030 -Standardize design criteria and spread them across Asia 	<ul style="list-style-type: none"> -Respond to changes in supply chains (logistics, sales, etc.) and lifestyles -Design specifications with recycling in mind -New material/structural innovation
Key action 2 Improving the Rate of Material Recycling	Promote resource circulation by improving the rate of recycling	<div style="border: 1px solid black; padding: 2px; display: inline-block;">PET</div> <ul style="list-style-type: none"> -Achieve 100% collection and maximize recycling (100% effective utilization) by 2030 -Promote quality recycling to achieve a horizontal cycle 	<ul style="list-style-type: none"> -Businesses: Establish and implement effective collection measures -Municipalities: Survey how PET is actually handled -Spread Japan's advanced design standards across Asia and worldwide
		<div style="border: 1px solid black; padding: 2px; display: inline-block;">Other plastics</div> <ul style="list-style-type: none"> -Achieve 60% recycling by 2030 -Pursue zero incineration/landfill 	<ul style="list-style-type: none"> -Give high-added value to recycled products -Develop a system to encourage the utilization of recycled products -Utilize both material and chemical recycling
Key action 3 Developing and Disseminating Chemical Recycling	Promote the development and social implementation of chemical recycling as an alternative method to material recycling	<ul style="list-style-type: none"> -Establish the best mix of recycling to utilize the effectiveness of chemical recycling -Maximize the total amount of recycling including material recycling 	<ul style="list-style-type: none"> -Propose closed-loop models in line with technological conditions -Make certification- and incentive-related proposals -Verify model projects

Direction for the 5 Key Actions (2/2)

	Direction to aim for	Targets to achieve	Outline of activities
Key action 4 Developing and Disseminating Biodegradable Plastics	Reduce the environmental impact of plastics that are not collected and leak into nature by putting biodegradable plastics to appropriate uses	Help introduce approx. 2 million tonnes of biomass plastics by 2030	<ul style="list-style-type: none"> -Explore new uses and expand existing uses of biodegradable plastics -Compost, collect biogas from, and evaluate the resource performance of waste containing biodegradable plastics
Key action 5 Developing and Disseminating Paper and Cellulose Materials	Curb single-use plastic waste by making effective use of paper and cellulose as alternative materials	Expand the alternative material market By 2030: 0.1 million tonnes/year By 2050: 1 million tonnes/year	<ul style="list-style-type: none"> -Popularize paper-plastic composite materials -Applications to soft packaging, food containers, etc. -Recycle paper-plastic composite material containers -Standardize methods to evaluate biodegradability
(Cross-action theme) Sophisticating the sorting and collection system	Propose and implement a sorting and collection system that enables smoother circulation of plastic resources	Accelerate the effectiveness and efficiency of Key actions 1–5 through collaborative activities	<ul style="list-style-type: none"> -Optimize targets and collection methods -Implementation tests for creating a social system -Reform waste classification and treatment cost -Explore the possibilities of improving efficiency, traceability and implementation through effective use of ICT

5 Key Action Schedule

	2020	2021	2022	By 2030	By 2050
Key action 1 Reducing Plastic Consumption	Respond to changes in supply chains (logistics, sales, etc.) and lifestyles Design specifications with recycling in mind New materials/structural innovation	Design standardization	International contribution	Virgin plastics made from fossil resources 25% reduction in waste	
Key action 2 Improving the Rate of Material Recycling	PET Sorting and collection tests with municipalities or distributors Discuss composite materials and how to avoid dirt Other plastics	Sorting and collection tests with municipalities or distributors/Explore implementations (including chemical recycling)	Social implementation	100% collection Extensive recycling (100% effective utilization) 60% recycling	
Key action 3 Developing and Disseminating Chemical Recycling	Position chemical recycling Propose closed-loop models	Establish collaborations and frameworks for implementation	Regional/municipality-based demonstrations		Maximized utilization
Key action 4 Developing and Disseminating Biodegradable Plastics	New uses Explore uses Existing uses Research problems and discuss measures	Gradual commercialization in products (at least 10 cases by the end of FY2022) Implement measures and evaluate effects		Help introduce 2 million tonnes of biomass plastics	
Key action 5 Developing and Disseminating Paper and Cellulose Materials	Alternative materials Material development Recycling Plan a system for sorting, shredding, cleansing, pulping and waste plastic treatment Sorting and collection tests with municipalities or distributors	Marketing	Increase the variety Small-scale tests → Social implementation	Establish the domestic market and expand across Asia 0.1 million tonnes of materials alternative to plastics/year	1 million tonnes/year

-Container and packaging design innovations (Key action 1)

- Responding to changes in logistics, sales and lifestyles
- Recycling-oriented perspective
- Developing and applying new materials and structures

-Sophistication of material recycling (Key action 2)

- Developing and applying mono-materials
- Multi-layered film separation technology
- Advanced cleansing technology
- Assuring quality and giving high-added value to recycled products
- Maximizing utilization of existing facilities

-Maximized use of chemical recycling (Key action 3)

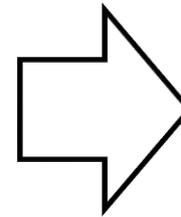
- Dealing with food stains and composite materials
- Utilizing large-scale treatment facilities, industrial complexes, etc.
- Decomposition into gasses and oils → Olefins
- Evaluating environmental performance with LCA

-Development and utilization of alternative materials (Key action 4 & Key action 5)

- Proposing uses for maximized utilization (including agricultural, civil engineering and disaster-related applications)
- Recycled resources (biogas, pulp, etc.)
- Composition technology for replacing single-use plastics → Separation technology
- Biodegradability evaluation

-Sorting and collection (Cross-action theme)

- Stopping littering, promoting a wide variety of collection methods (beside vending machines, in stores, in offices, etc.), increasing consumer awareness
- Covering industrial and business waste
- Expansion beyond the realm of containers and packaging (home electronics, automobiles, clothing, etc.)
- ICT utilization/traceability and creation of high-added value



First extract potential problems through demonstration tests, and then move on to Phase 2:

- Requests for policy
- Social system proposals
- Expansion across Asia



Demonstration Tests Planned Under the 5 Key Actions

	Theme	Outline		Partners	Time
		Activities	Evaluation items		
Key action 1	Reducing plastics in mouthwash containers (thinner containers/pouches)	-Designing specifications according to new quality standards	-Plastic reduction -Marketability	Product and container manufacturers, etc.	2021–
Key action 2	Voluntary collection of plastic drink bottles	-Sophisticating collection from collection boxes beside vending machines -Providing a wide variety of means to get bottles back into collection loops by focusing on the flow lines of people	-Collection amount, actual sorting and dirt -Ease of disposal	Municipalities, retailers, etc.	2020–
Key action 2	Material recycling of soft packaging for toiletries	-Collection in supermarkets and other stores -Exploring possibilities with large or environmentally-advanced municipalities, smart cities, etc.	-Collection amount and residual liquid amount -Recycled material quality -Understanding between consumers	Municipalities, retailers, etc.	2020–
Key action 3	Chemical recycling of plastics that are not compatible with material recycling	-Starting with easier-to-recycle raw materials (offcuts from manufacturing processes etc.) -Moving on to discuss inclusion of “food packaging plastics,” a material recycling challenge -Promoting horizontal recycling when selecting plastic users and discussing details with partners	-Quality of recycled raw materials -Ease of handling -Processing capacity	-Users of recycling raw materials etc. -Places: 2021: Industrial complexes 2022: Plastic producers, users of plastics, etc.	2021–
Key action 4	Composting and collecting biogas from biodegradable plastics	-2020: Utilizing existing composting facilities -2020: Introducing new facilities at individual companies	-Resource performance of compost -Sustainability (processing capacity) of compost	Municipalities, facility manufacturers, etc.	2020–
Key action 5	Recycling unused paper-based composite material waste for paper	-Verifying shredding and cleansing machines for paper-plastic composite material containers -Developing a more efficient method to recover pulp from plastic-laminated paper -Developing technology to deal with aluminum-lined plastics from plastic-laminated paper mixed with aluminum, which is widely used in liquid containers	-Separation accuracy and yield -Recycled material quality	Collection: Airplanes, office buildings, etc. Cleansing/Pulping: Facility manufacturers etc.	2020– (Starting with pulping)

- Reducing plastics in mouthwash containers: New design standards for containers and packaging

Responding flexibly and appropriately to changes in the environment

(logistics and sales/global market and lifestyles),

designing specifications with recycling in mind, and utilizing new technology

Challenges:

- Respond effectively to changes in the business environment
- Effective use of supply chains' total capacity

Specific plans

- Reduce plastics in mouthwash containers and more
- Decrease the size of bottle labels or eliminate them
- Improve external packaging (plastic → paper)

Goal:

- Design containers and packaging according to new standards and put them into practice on a global scale

- Voluntary collection of plastic drink bottles:

Taking Japan's world-leading efforts in recycling plastic drink bottles to the next stage

Proposing smoother material recycling through voluntary collection

by municipalities or retailers

Challenges:

- Collection boxes beside vending machines being used as garbage bins
- Mixed collection by municipalities making recycling difficult (e.g. broken glass mixed in)

Goals:

- Maximize the recycling rate (85% at the moment)
- Expand the action globally through all-Japan efforts going beyond the boundaries of different industries

- Material recycling of food and toiletry containers and paper-plastic composite material containers:
 - Beginning to recycle containers that are currently incinerated due to dirt or other reasons
 - Proposing a series of processes from sorting and collection to material/chemical recycling of soft packaging for food products, shampoo refill packaging and paper-plastic composite material containers (noodles/yogurt/paper cups)
 - Challenges:
 - Composite materials with high barrier properties; incineration due to severe dirt
 - Social systems' dependence on incineration
 - Goals:
 - Collection and recycling of adequately cleaned products from municipalities, citizen communities, retailers, companies (offices, aircrafts, etc.), smart cities, etc.
 - Best choice between, and best mix of, material recycling and chemical recycling

- Chemical recycling of plastics that are not compatible with material recycling:
 - Proactive use of chemical recycling
 - Meeting the great expectations for Japan as a world-leader in technology/systems
 - Challenge:
 - Composite materials and severely dirty containers and packaging which are incompatible with material recycling even after cleaning
 - Goals:
 - Identify the possibilities of large-scale recycling in industrial complexes
 - Explore effective uses of existing systems and facilities owned by municipalities

➤ Composting or collecting biogas from biodegradable plastics

Easy-to-understand, easy-to-use biodegradation

Challenges:

- Optimal uses and treatment methods that implement biodegradation
- Inadequate capabilities of existing collection and recycling processes

Goals:

- Make effective use of these measures where collection is difficult
- Promote recycling of materials from compost

➤ Cross-action theme: Effective use of ICT

Challenges:

- Difficulties and effort in sorting
- Lack of advantages for related parties

Goals:

- Examine scalability into many different areas of data utilization from the perspectives of automation, traceability, recycling business, interaction with market information and improvements to efficiency and reliability
- Promote affinity-based collaborations with smart cities, etc.

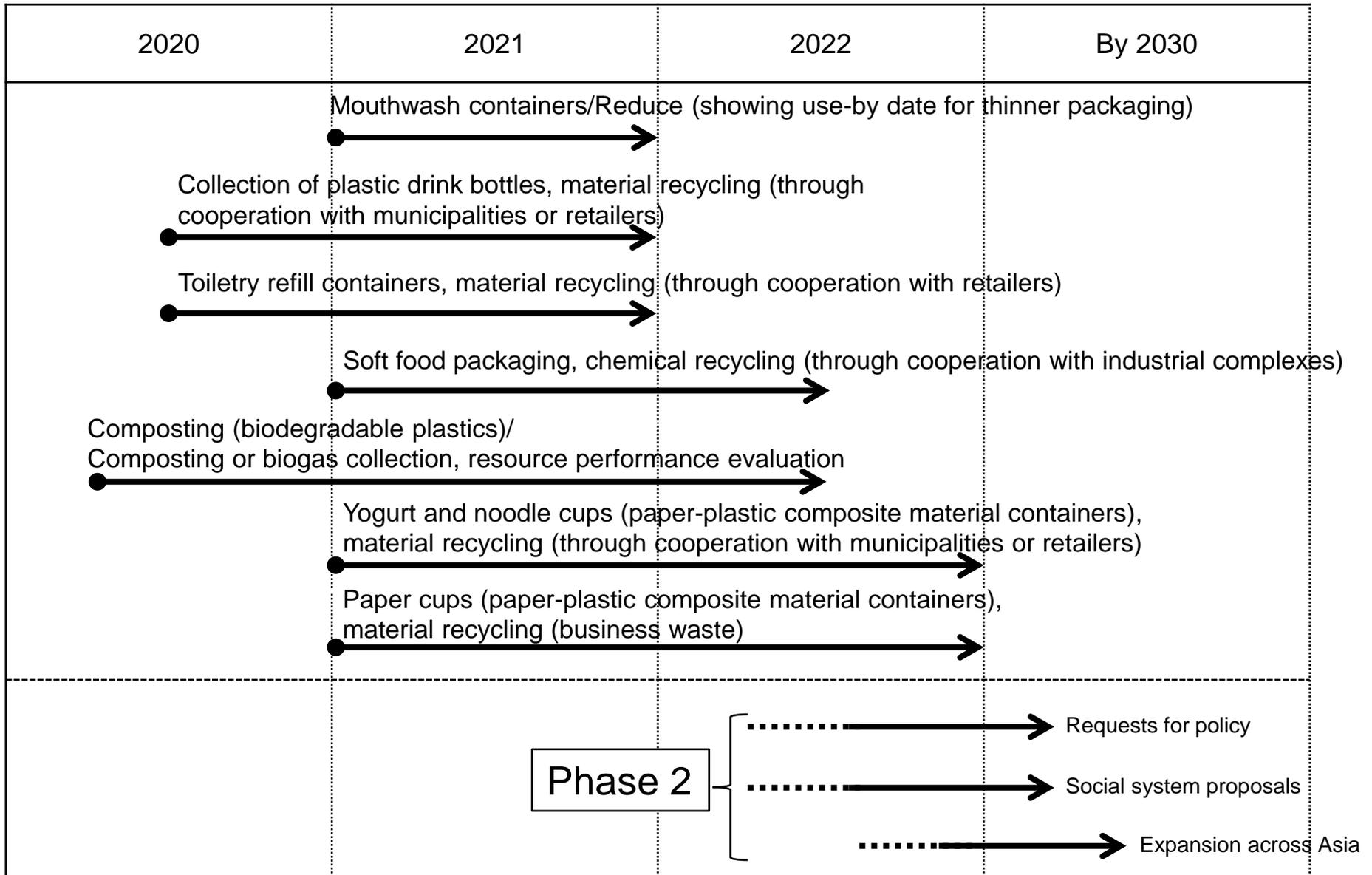
Toward Phase 2: Direction after demonstration tests

- Requests for policy (Act on the Promotion of Sorted Collection and Recycling of Containers and Packaging, Waste Management and Public Cleansing Act, etc.) and proposals on Plastics Material Cycle Strategy
 - Cooperation with responsible administrative authorities, industrial associations, business associations, environmental NGOs, etc.

- Proposing a new social system
 - Pursuing general understandability, economic efficiency and business advantages
 - Encouraging consumers, municipalities and companies to participate and continue
 - Points to consider:
 - Reasonable allocation of operating expenses
 - Ensuring profitability and new business creation
 - Community revitalization, measures for the elderly, ICT-based assessment of friendliness, eco-points, etc.

- Expansion across Asia
 - Partnerships with governments and other organizations in Indonesia and other parts of Asia, as well as JICA, etc.
 - Funding
 - Cooperation with the Japanese government, NEDO and international organizations such as AEPW

Demonstration Test Schedule

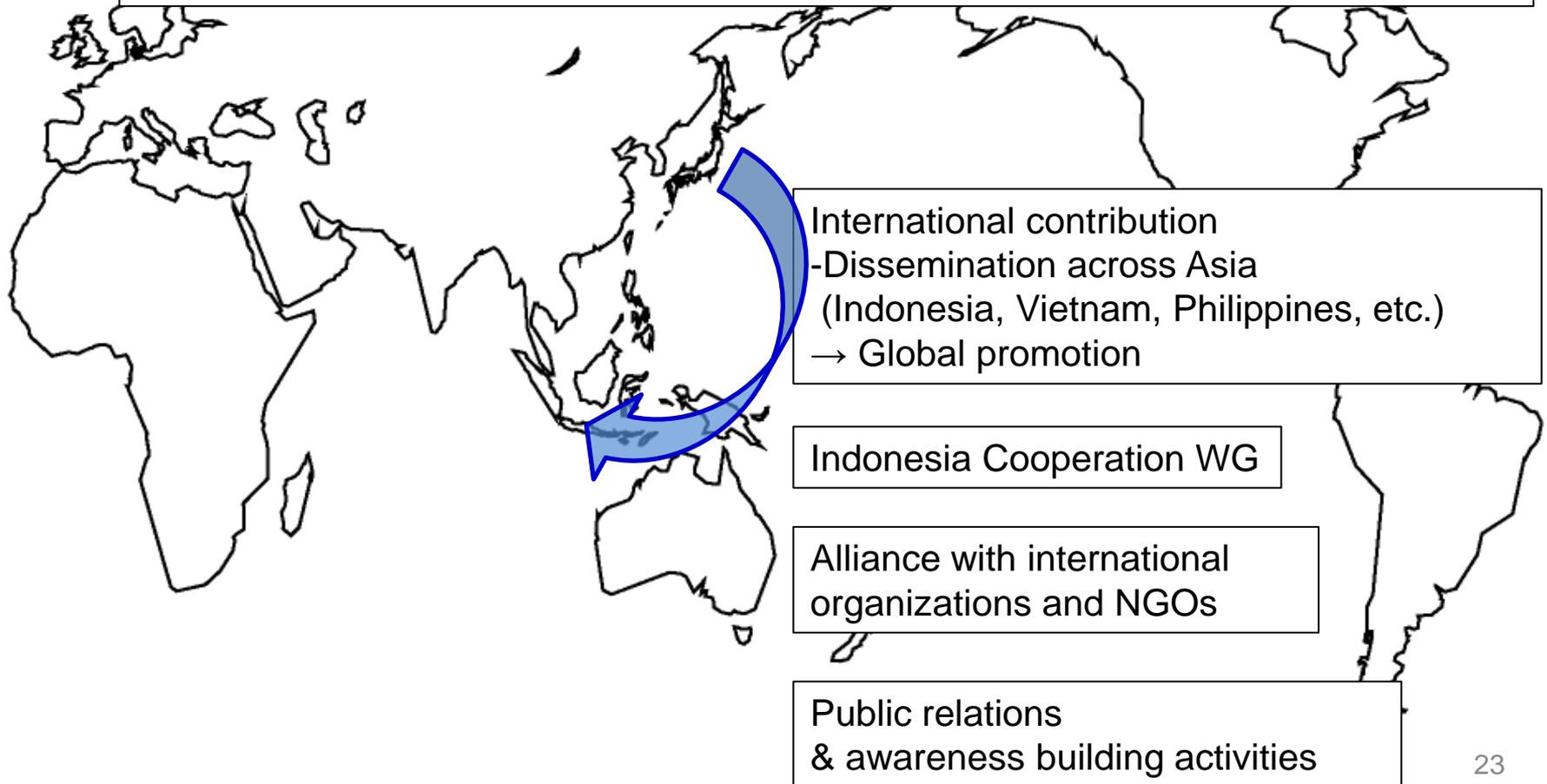


Worldwide Dissemination

- Disseminate the “Japan model” worldwide as a made-in-Japan solution

Standardization of environmentally-compatible design → Global promotion

- New design standards for “Reduce”
- Design standards for plastic bottles (Consider incorporating into ISO)
- Method to evaluate biodegradability of paper and cellulose materials (Consider incorporating into ISO)



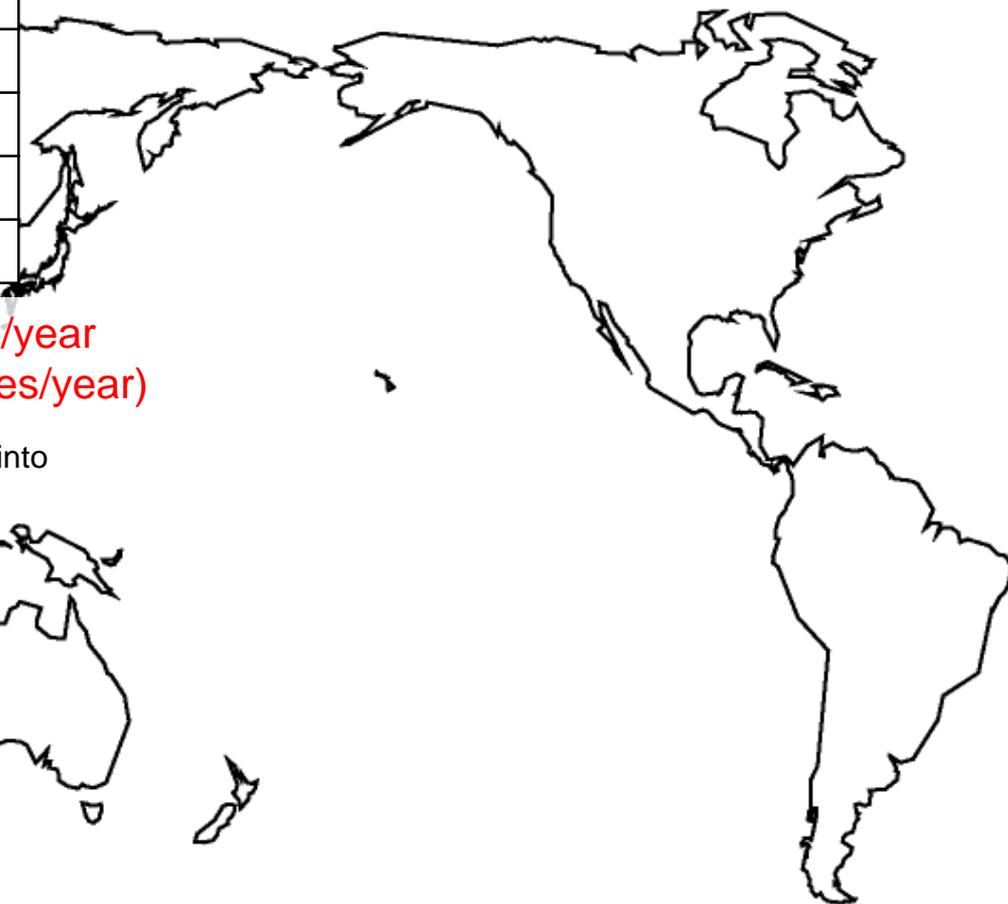
3. CLOMA ACTION PLAN: Background and History

Flow of Plastic Waste into the Ocean

		Million tonnes/year
1	China	1.32–3.53
2	Indonesia	0.48–1.29
3	Philippines	0.28–0.75
4	Vietnam	0.28–0.73
5	Sri Lanka	0.24–0.64
...		
30	Japan	0.02–0.06

Grand Total **4.78 to 12.75 million tonnes/year**
(approximately 8 million tonnes/year)

Source: Jambeck et al. Plastic waste inputs from land into the ocean, Science (2015)





History of the CLOMA ACTION PLAN

January 2019:

CLOMA is founded between 159 companies and associations

June 2019:

CLOMA VISION is established and the CLOMA ACTION PLAN scheme is announced

September 2019:

Development of CLOMA ACTION PLAN starts, WGs discuss implementation of the 5 Key actions.

Participating companies:

WG1: 35, WG2: 49, WG3: 29, WG4: 41, WG5: 41

April 2020:

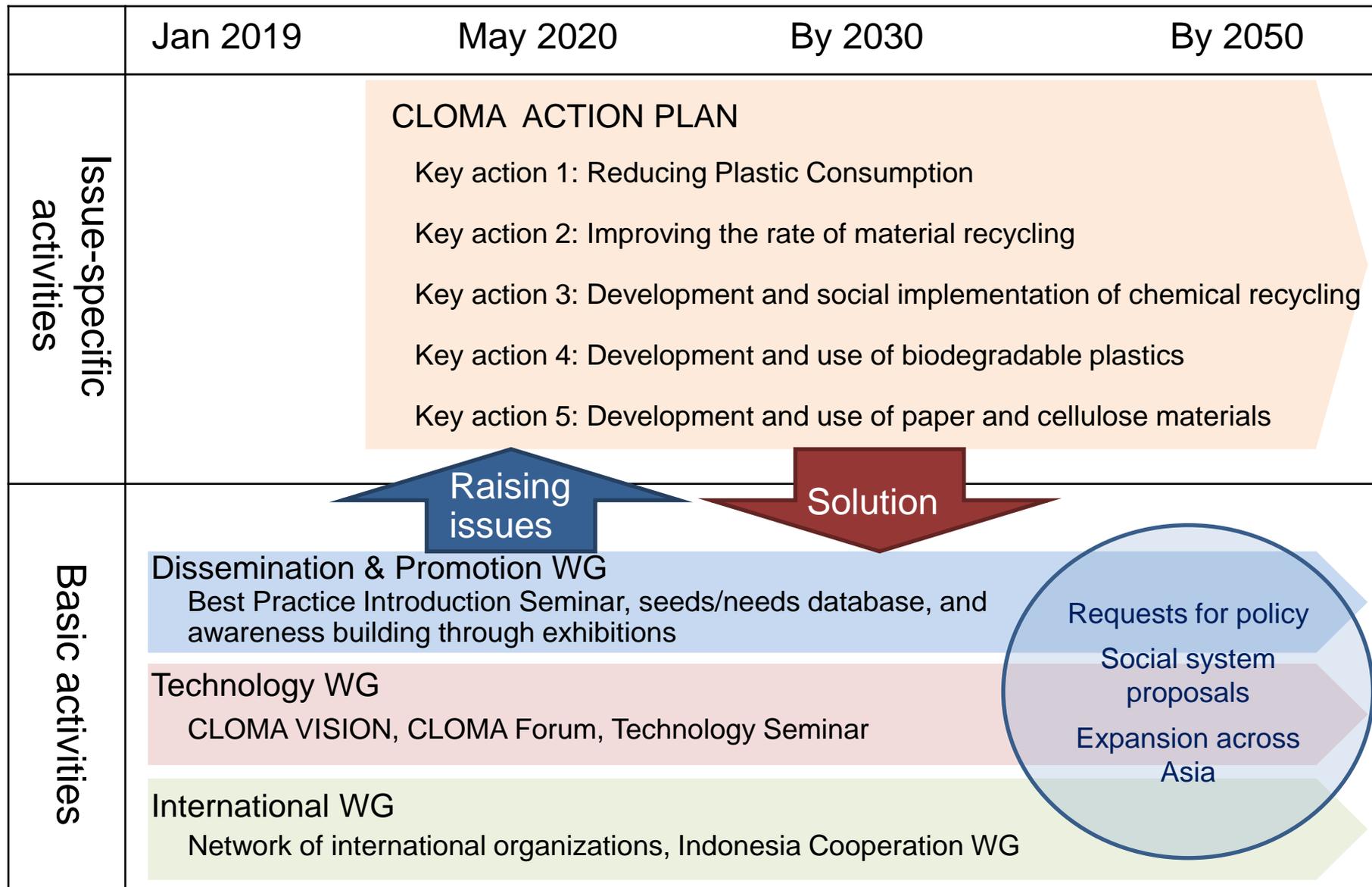
CLOMA Executive Committee approves the plan

May 2020:

CLOMA ACTION PLAN is published after approval by CLOMA General Assembly (333 companies and associations)

As of May 7, 2020

Positioning of the CLOMA ACTION PLAN



➤ CLOMA business matching results
(Source: Member questionnaire from Feb 2020)

Information exchange:	50 cases
R&D:	18 cases
Business planning:	8 cases
Business implementation:	6 cases



Second Best Practice Introduction Seminar on Sep 5, 2019

➤ Business matching examples



日本製紙グループ
NIPPON PAPER GROUP

Foam barrier trays by
Kitamura Chemicals



40% reduction in plastic use



Paper-based barrier
material by Nippon
Paper Group
SHIELDPLUS®



Film production
technology by
Toppan Printing



Sales of checkout bags made
from biodegradable plastic
started in Dec 2019

Biodegradable plastic
by GSI Creos
MATER-BI



Marine biodegradable
polymer by Kaneka
PHBH®



Used in straws at SEVEN
CAFÉ since Nov 2019

SEVEN CAFÉ
by Seven & i
Holdings

- Developing collaborative relationships with companies and associations with global information and influence
 - Exchange information → Reinforce partnerships
 - Explore specific themes for collaborations
 - October 2019: Plastics Europe, WBCSD, IUCN, WEF
 - November 2019: AEPW



Establishment of the Indonesia Cooperation WG

- Activity agreement with the Indonesian government
 - Indonesia Cooperation WG was set up in CLOMA to discuss sustainable measures for reducing of plastic litter in the ocean
 - The Indonesia National Plastic Action Partnership (NPAP) serves as the point of contact → The Japanese side will propose measures in August 2020



Piled-up garbage
(Height: 20–30 m)

