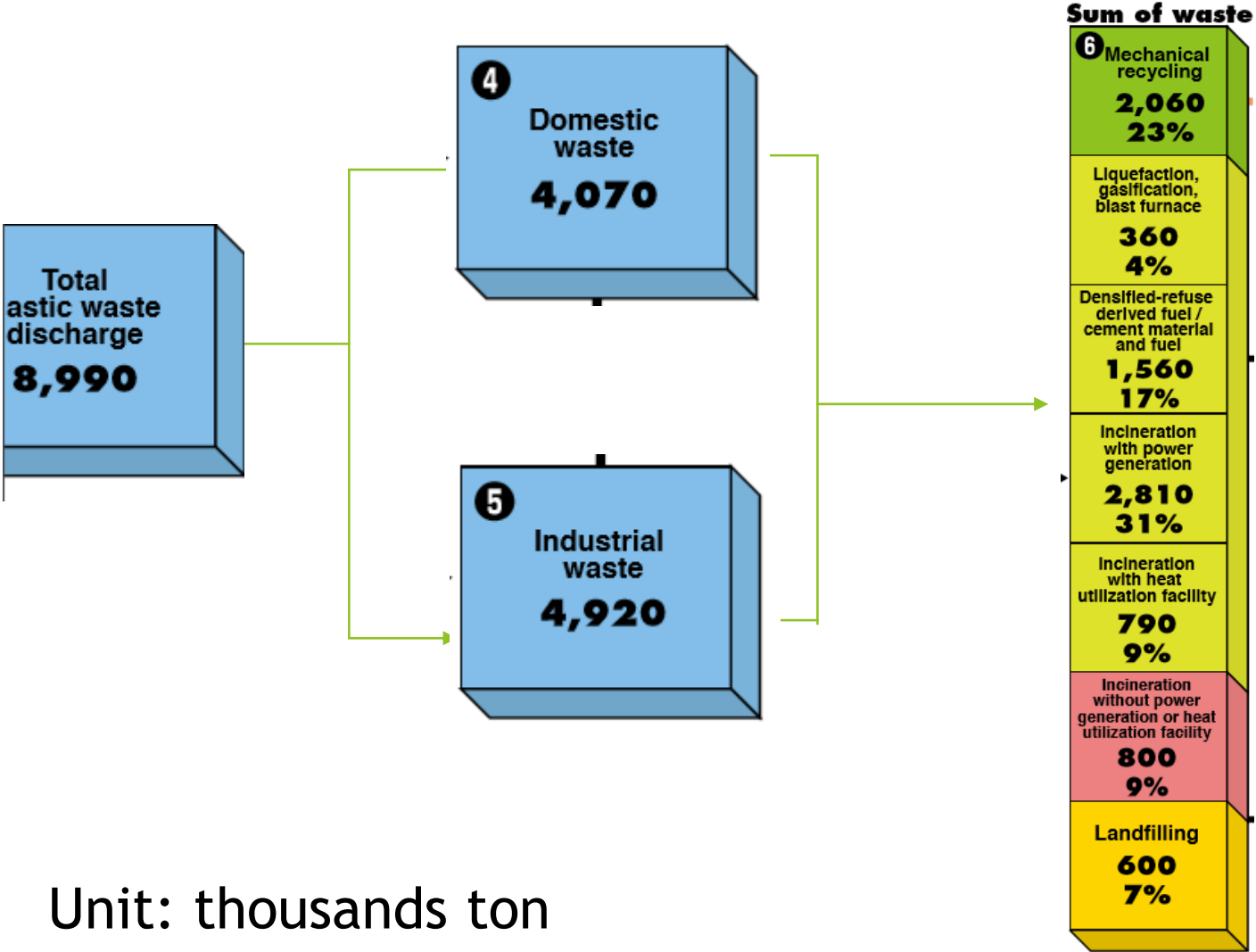


Recycling and Resource Recovery Options of Plastic Waste

Hideki MINAMIKAWA

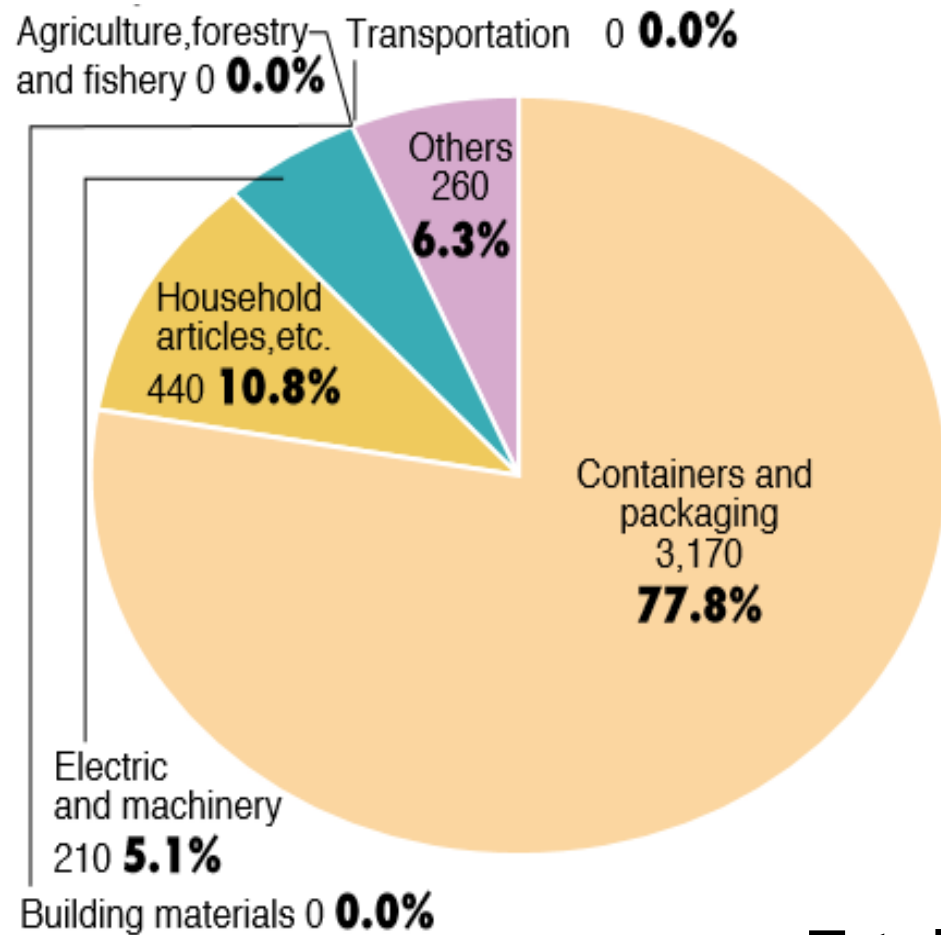
Japan Environmental Sanitation Center
(JESC)

Flowchart of Plastic Waste Discharge Amount (2016)



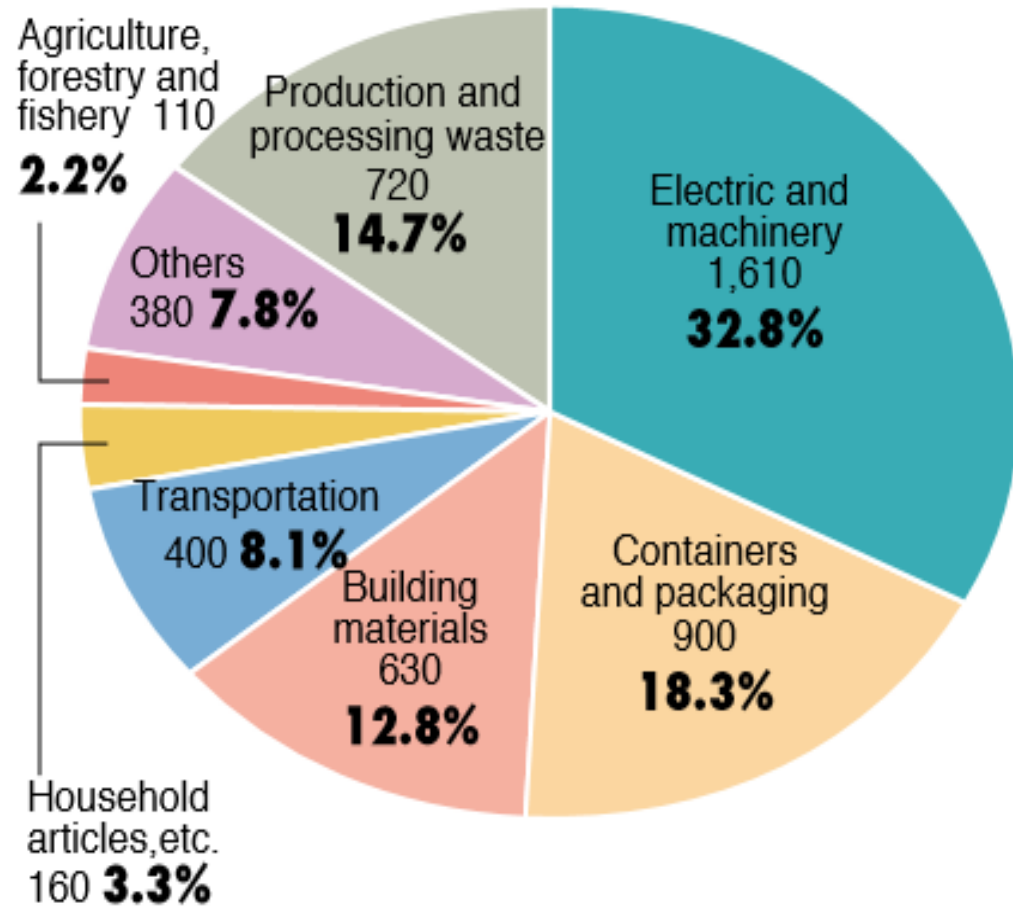
Unit: thousands ton

Detailed breakdown of Plastic Waste in Municipal Solid Waste (2016)



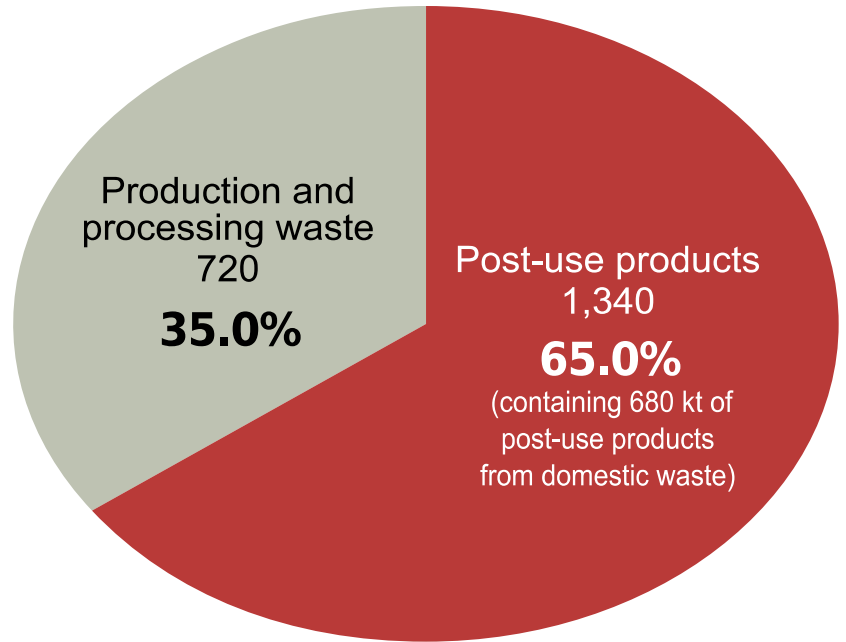
Total: 4,070 thousands ton

Detailed breakdown of Plastic Waste in Industrial Waste (2016)



Total: 4,920 thousands ton

Details of material recycle (2.06 million ton)



- Pet Bottle
- Wrapping Film
- Home Electorical Appliances
- Plastics for Agricultural usage
- Foam Plastic packing material
- Wire Covering
- Container

Recycled Materials

Recycled Material of Pet Bottle



Business Suit



Carpet



Curtain



Sewerage Manhole
Cover



Plastic
Sleeve



Business
Card

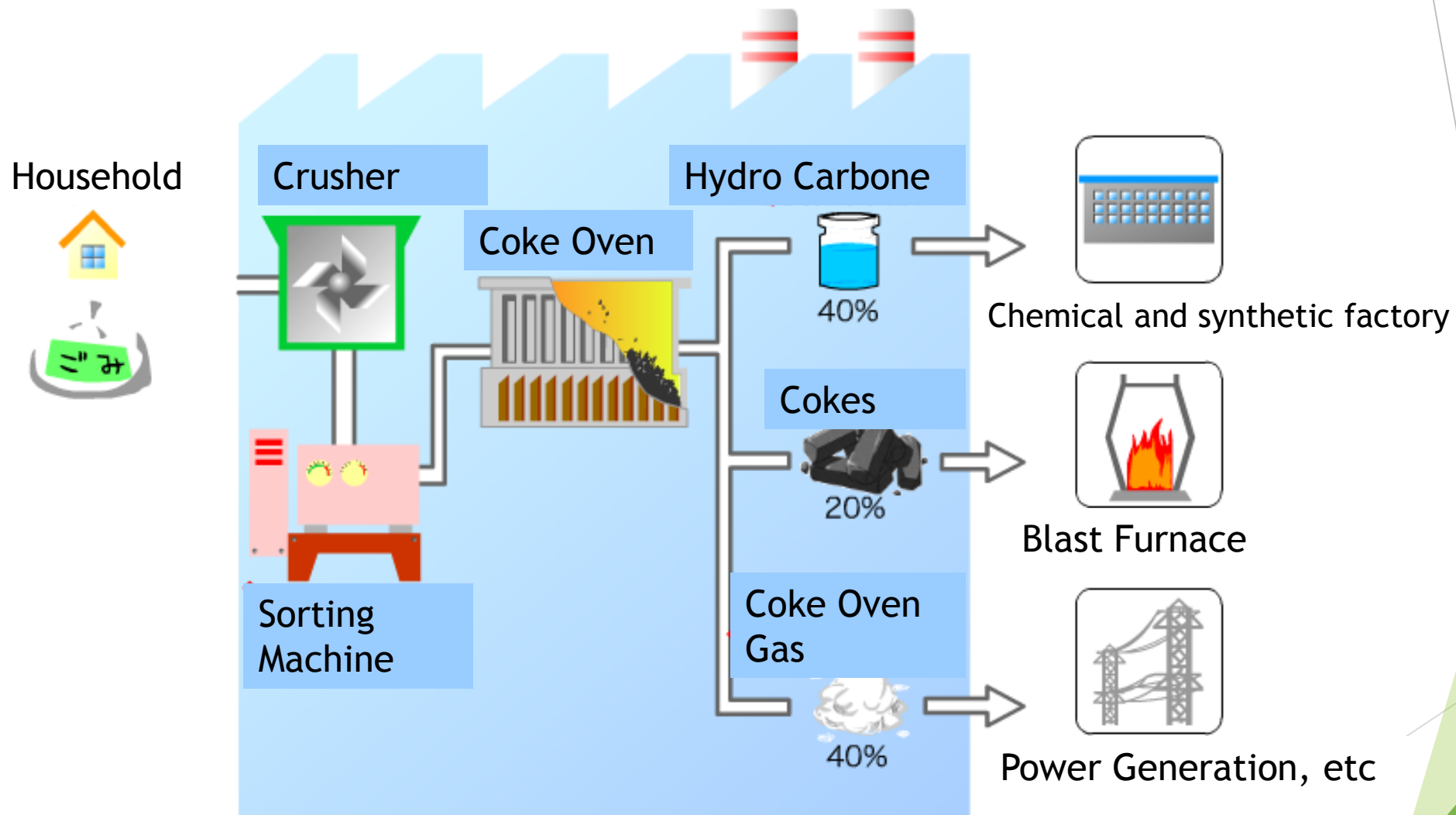
Recycled Material of expanded polystyrene(styrofoam)



Stationery, Daily Commodity, Building materials, etc



Chemical Recycle

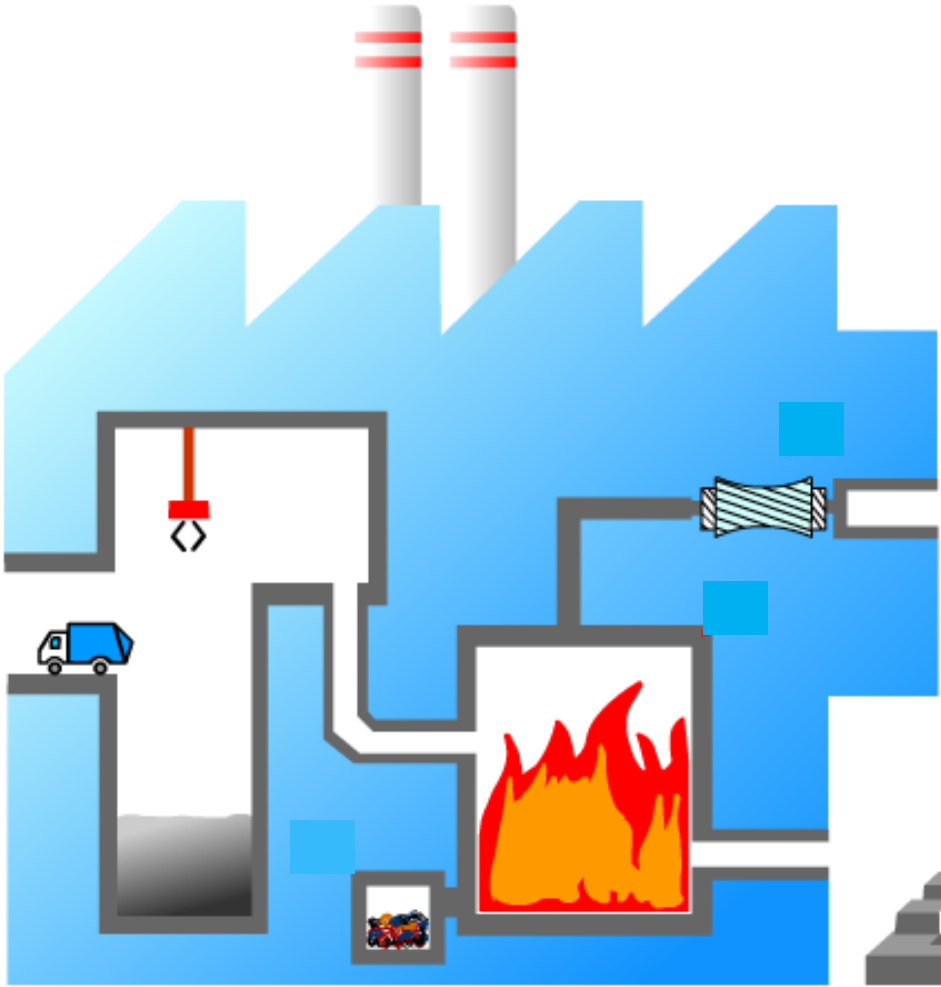


Thermal Recycle

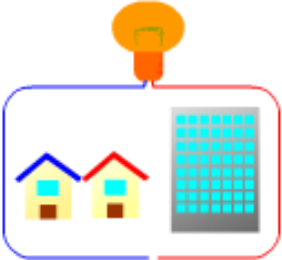
Domestic Waste
in A City



Domestic Waste
in B City



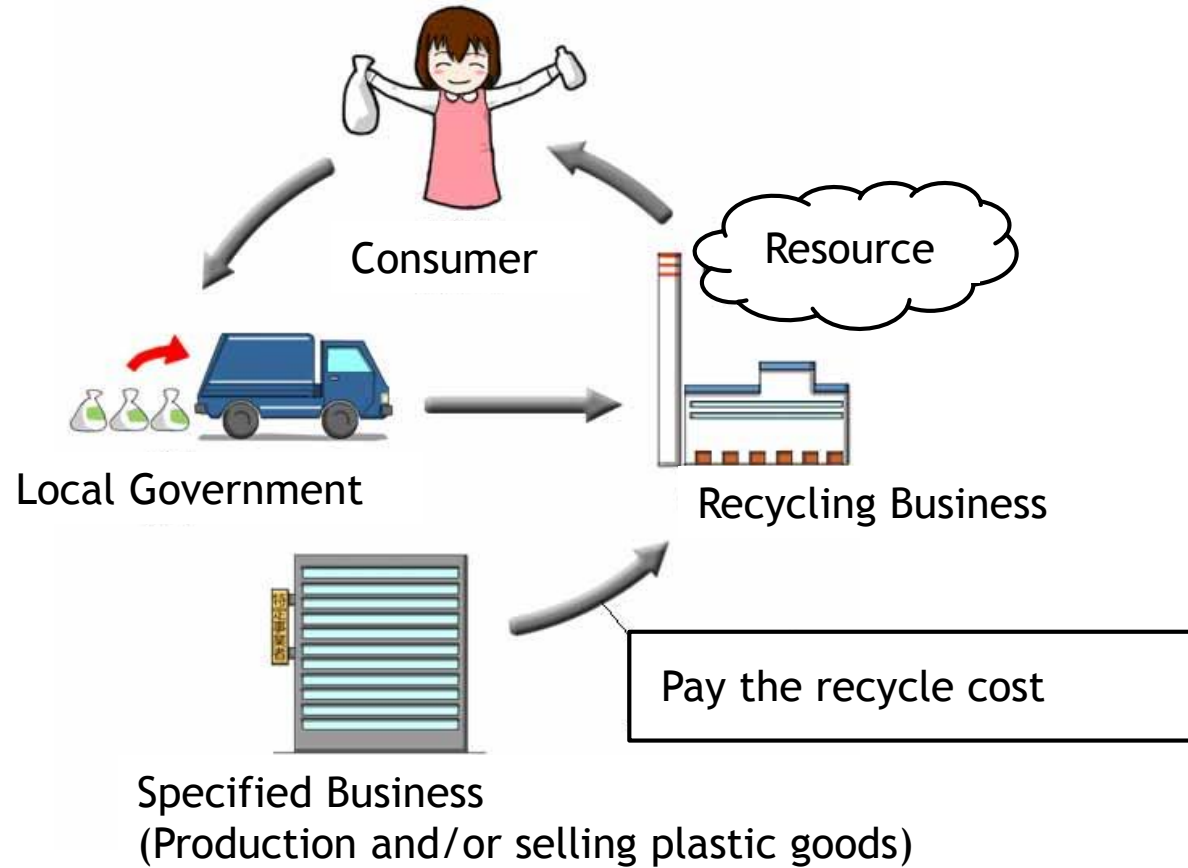
Power Generation



Thermal Energy



Containers and Package Recycling Law



General Product Labelling

Green Purchasing Law

- ▶ Recycling will be promoted when recycled products were produced and it was consumed.
- ▶ The law was enacted in 2000, to promote the consumption of ecology products lead by national government and related associations.
- ▶ Electric Home Appliances : Containing a lot of recycled plastic
- ▶ Stationery Product : Containing recycled plastic more than 40% of total plastic weight

Suffer by Washed ashore, drifting garbage

- Change of Marine Environment including bioecological system
- To be washed ashore to specific area, repeatedly
- It is difficult to be recycled due to moisture, saline matter, contamination
- They are deteriorated due to ultraviolet ray and high temperature, and break into small fragments

Law on Promoting the Treatment of Marine Debris (2009)

Objective

To reduce generation of marine litter and process them smoothly for protecting good scenery and environment of coastal area.

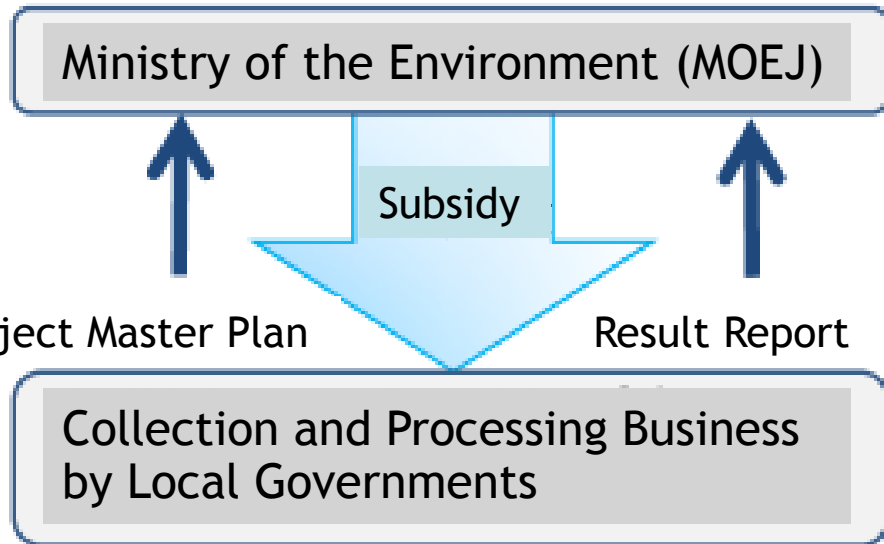
Basic Philosophy

- Comprehensive landscape preservation and reclamation of coastal area environment
~To prevent good landscape, considering life's diversity~
- To clarify the responsibility and promote effective process
~To clarify the responsibility of concerned parties such as coastal administrator~
- Effective control of marine litter generation
~Common challenge of public land from mountain, river and sea~
- Prevention of coastal area's environment
~ Necessity for people's affluent and pleasant life ~
- Appropriate role allotment and cooperation of various entities
~To promote active participation by nations~
- Promotion of international cooperation
~ Common problem for Japan and surrounding countries~

Fiscal Measures

- ① Government should take necessary measures to promote provision for marine litter, washed ashore.
- ② Government should give special consideration for specific areas such as isolate island
- ③ Government should give consideration to promote activities by private association

Project to promote provision for Coastal Objects by local governments



Promotion of collection and Processing Business of Marine Debris



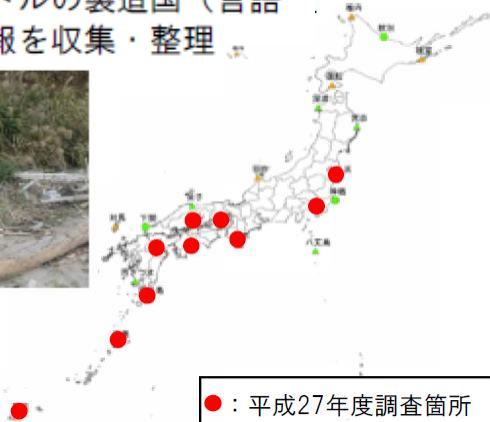
Collection of Marine Debris by heavy equipment and volunteer

Promotion of measures to collect and process Marine Litter (washed ashore, drifting, seabed)

Survey of actual situation regarding Marine Debris by Ministry of the Environment Japan (Micro Plastic)

Research of Marine Litter

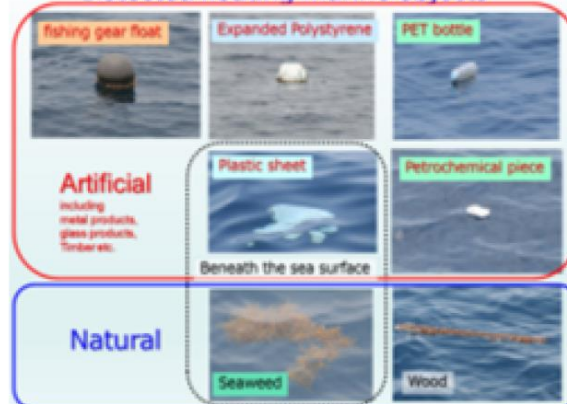
5年間で28カ所の海岸をモニタリング調査し、ごみの量や種類、組成、ペットボトルの製造国（言語表記）等の情報を収集・整理



Research of Ocean Debris

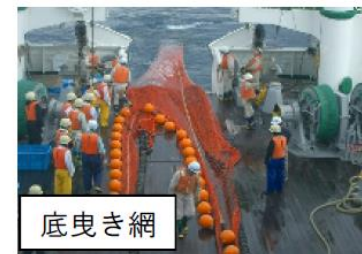
沿岸海域または沖合海域において、船上から海面上のごみを目視で確認し、海域別のごみの密度及び現存量を推定

Detected floating marine objects



Research of Submarine Garbage

沿岸海域または沖合海域において、底曳き網により、海底ごみを採取・分類し、海域別のごみの密度及び現存量を推定

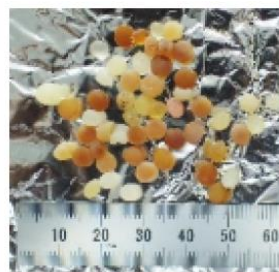


Extraction



Research of Micro Plastic

マイクロプラスチックについて、その海洋汚染の実態把握を推進。具体的には、
・日本周辺海域等における分布状況
・マイクロプラスチックに吸着しているPCB等の有害化学物質の量を把握するための調査を実施



レジンペレット ネットによる採取

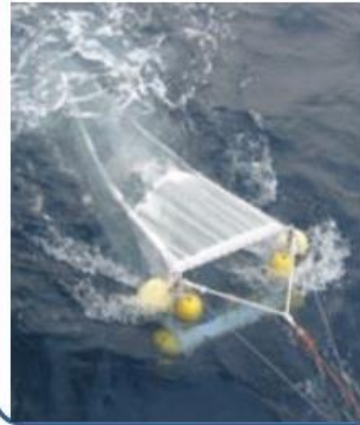
Survey of actual situation regarding Marine Litter by Ministry of the Environment Japan(Micro Plastic)

Method



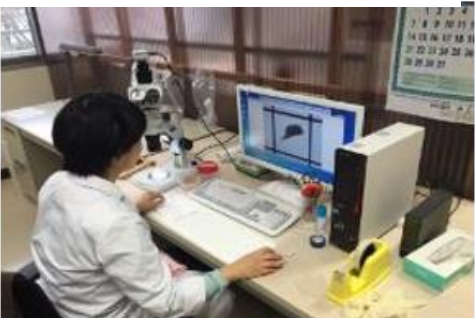
Micro Plastic ... Plastic piece smaller than 5mm

Extraction by toil



Gape (of the toil) : 75cm * 75cm
(0.56 m²)
Mesh Size: 350µm
Length of the Toil: 300cm
Towing speed : 2-3 knots
Towing Time : 20 min.
(with flow meter)

Measure the number of Microplastic: 0.3 mm -5.0 mm

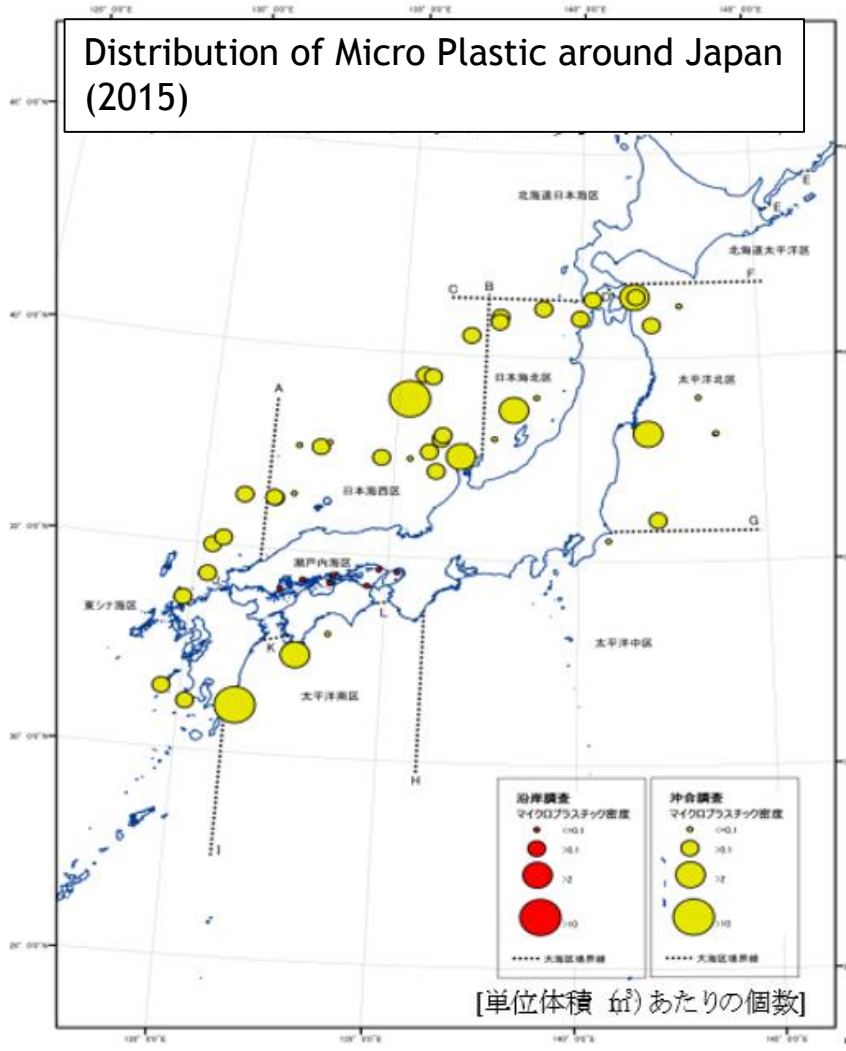


Collected Micro Plastic

Measurement by Microscope

Result

Distribution of Micro Plastic around Japan (2015)



Survey of actual situation regarding Marine Debris by Ministry of the Environment Japan (Micro Plastic)

Latest Result

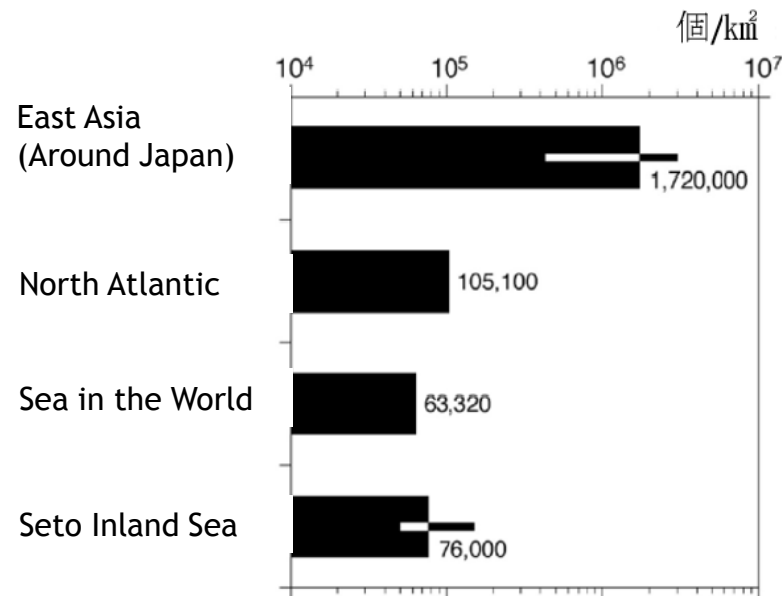
According to the research of Marine Debris (Micro Plastic) by MOEJ, In ocean area around Japan (East Asia)

Quantity of Micro Plastic was

- 16 times of North Atlantic
- 27 times of other ocean area in the world

It can be said that Marine area around Japan is the hot spot of Micro Plastic.

Quantity of Micro Plastic of each ocean area (per 1 km²)



Isobe et al, Marine Pollution Bulletin (2015)

Conclusion and assignments in the future

1. Reduction and Recycle of Plastic Waste
2. Cleaning of Coastal areas and appropriate disposal of collected garbage
3. Prevention of inflow to drains and establishment of no throw away manners
4. Researches and countermeasures on microplastic pollution
5. International Cooperation

Thank you very much
for your kind attention