

# Japan's Resource Circulation Policy for Plastics

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# Material Flow of Plastics in Japan

- Plastic waste = 9.4 million tons/year ( 2 % of total waste: 431mt)
- Recycling rate = 24.8%, Recycling & Recovery rate = 81.6%
- CO2 emission (mainly incineration): 18 million tons (60% of waste sector)

## [Use & waste generation]

**Plastic Waste**  
(9,400kilotons)

**Packaging,  
Container**  
4,260kt

Packaging  
3,680kt

PET bottle  
580kt

**Home Appliance**  
280kt

Air conditioner, TV,  
Refrigerator, Washing  
machine

**Automobile**  
330kt

**Small home  
appliance**  
60kt

**Construction**  
590kt

**Other product**  
3,060kt

Household goods,  
Clothing, Furniture,  
Toy, Agri-Fishery tool  
etc

**Used  
Products**  
(8,680kt 92%)

**Production  
Loss**  
(720kt, 8%)

## [Collection]

**Packaging Law**  
(municipal collection)  
1,040kt

Packaging  
745kt

PET bottle  
292kt

**Home Appliance Law**  
120kt

**Automobile Law**  
220kt (ASR)

**Small appliance Law**  
6kt

**Construction Law**

**Other**  
(Outside of recycle law  
e.g. burnable waste)  
6,880kt

## [Recycling/treatment]

**Material Recycling**  
2,030kt  
(22%)

**Chemical Recycling**  
300kt  
(3%)

**Recycling**  
2,330kt  
(25%)

**Power  
Generation**  
(3,190kt, 34%)

**RPF/  
Cement raw fuel**  
(1,180kt, 13%)

**Energy  
Recovery**  
5340kt  
(57%)

**Heat utilization**  
(970kt, 10%)

**Incineration**  
(980kt, 10%)

**Land-filling**  
(740kt, 8%)

**Unutilized**  
1,730kt  
(18%)

(Year 2013)

# Reduction of Plastics

- Reducing plastic bags by partnership - agreement, voluntary actions
- Charge of plastic bags – major for supermarket and CO-OP

## Tripartite Agreement for reduction of plastic bags

Citizens  
Enhance  
actions

Businesses  
Stop free bags

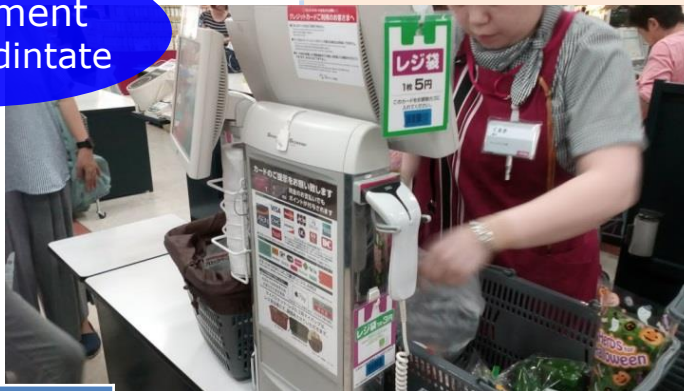
Government  
PR · Coordinate

## [Case study]

- 9 industries (incl. supermarket, laundry services, drug store, DIY store) charge plastic bags
- 95% of consumers bring "MY Bags" (previously just 10-20%)

[Toyama Prefecture, Mar 2016]

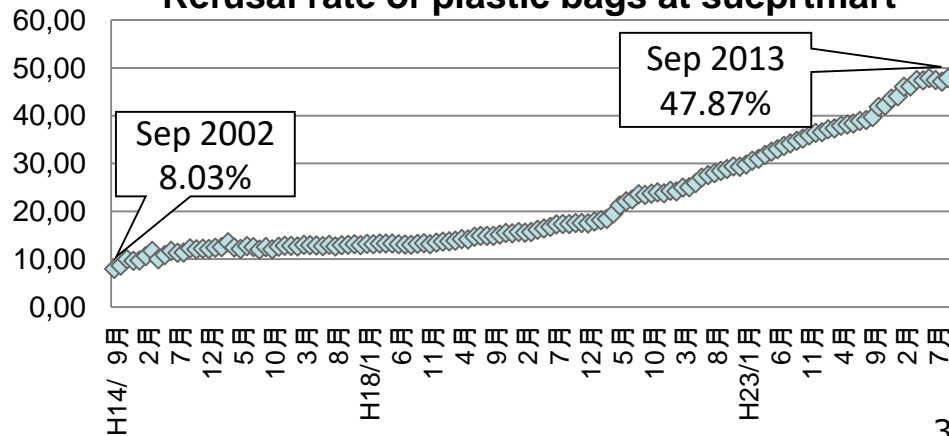
(e.g. 5 cent for a big bag  
3 cent for a small bag)



## Charge of plastic bags

Supermarket	80%
CO-OP	62%
Drug Store	25%
Department Store	20%
Convenience Store	9%

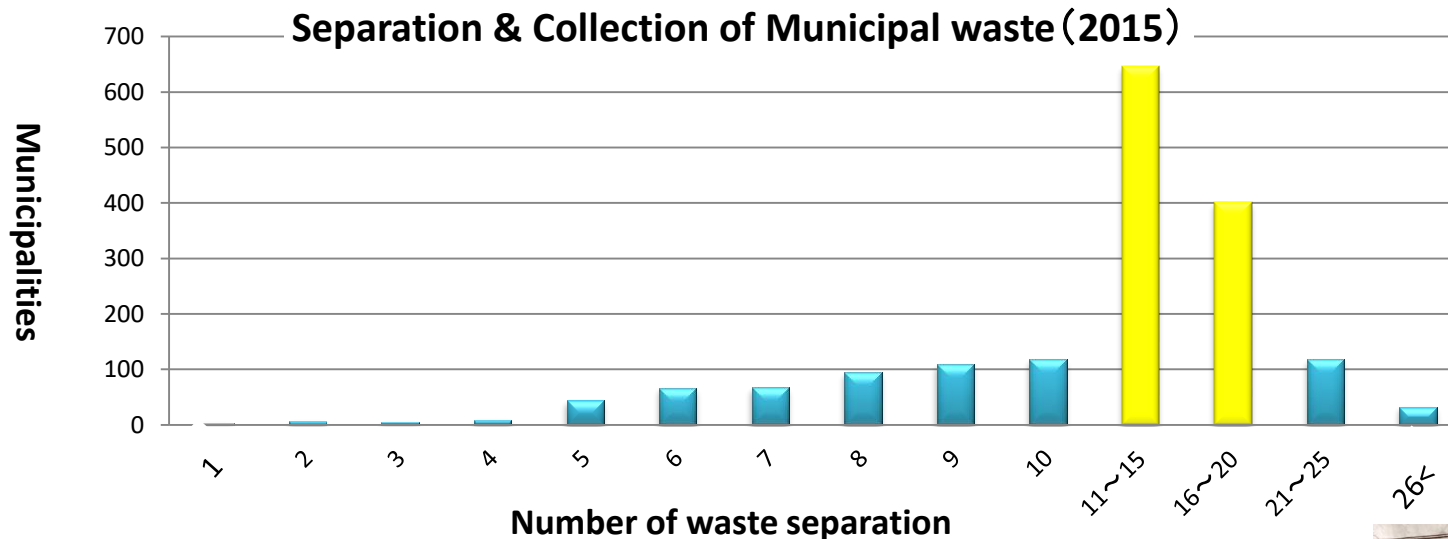
## Refusal rate of plastic bags at supermarket



# Collection of municipal plastic waste by municipality

- Municipal waste: mainly 10-20 Separation for collection, recycling
- Plastic: Separation into 4 (Packaging, PET bottle, PS tray, Goods)

Municipal waste



Plastic waste

● Plastic packaging → 745 kilotons/year

● PET bottle → 292 kilotons/year

● PS tray → 6 kilotons/year

● Plastic goods (\*collected by small number of municipalities)



# Collection of Plastic waste by business

- Separation into 4 (Bottle, cap, PS tray, Egg pack) with collection box



(Shopping Mall)



Cap

PET bottle  
↓  
20kilotons/year

Egg pack

PS tray  
↓  
10kilotons/year

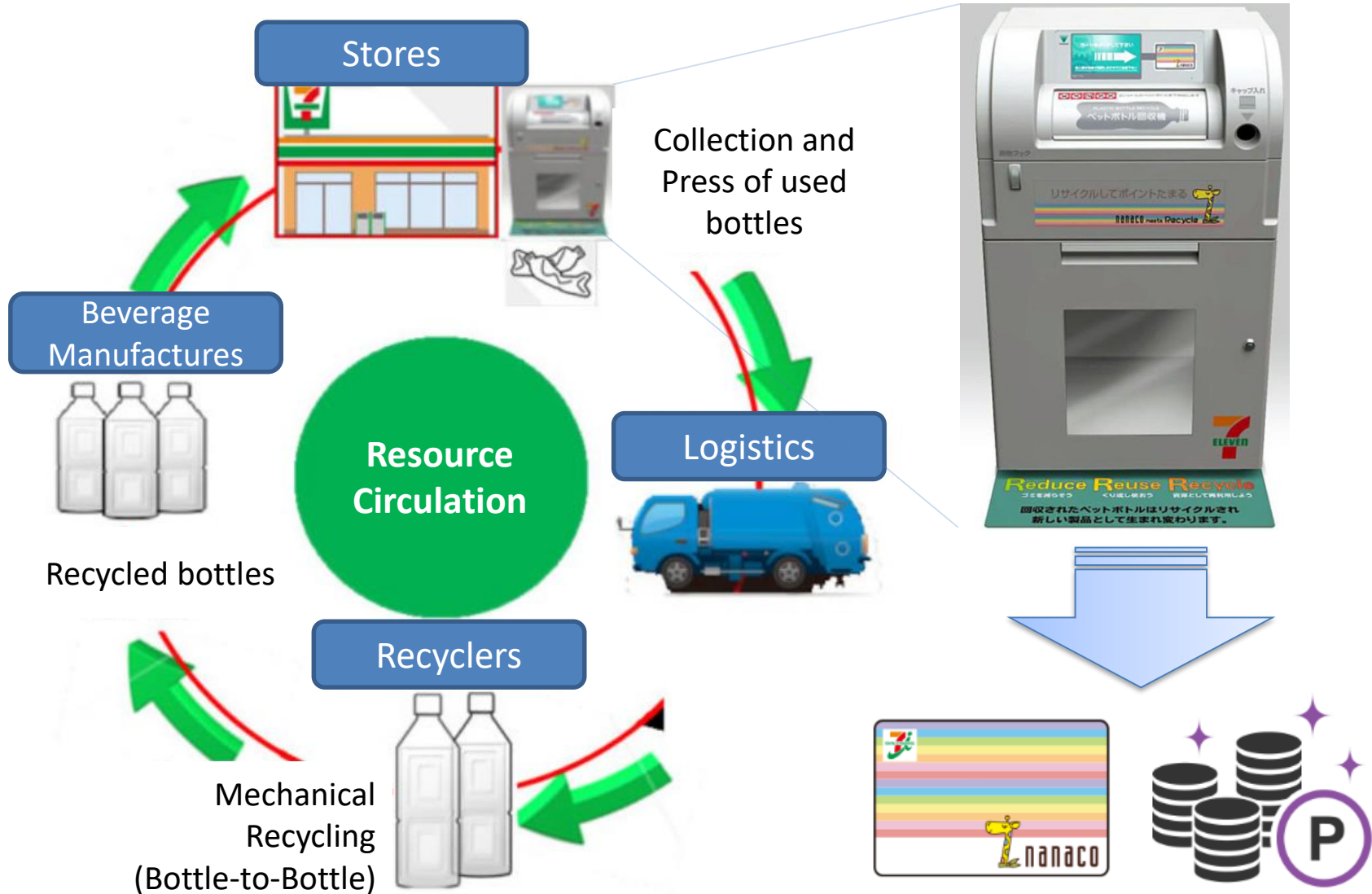


(Station)



# Incentivized Collection of PET bottles

- Bottle collection connected with Electric Money system



# Recycling of plastic packaging

➤ Output: 60% as chemical recycling; 40% as material recycling

## Material (Mechanical) Recycling



Palette

## Recycled resin

(e.g.)  
PP resin (pellet)  
= \$300-400/ton



Other

39.6%

60.4%

Coal alternative with  
cokes oven



Syngas



Blast  
furnace  
reducing  
agents



## Chemical (Feedstock) Recycling

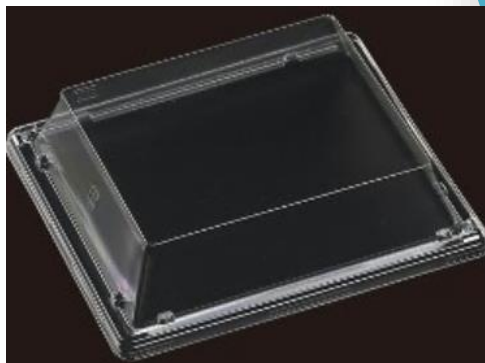
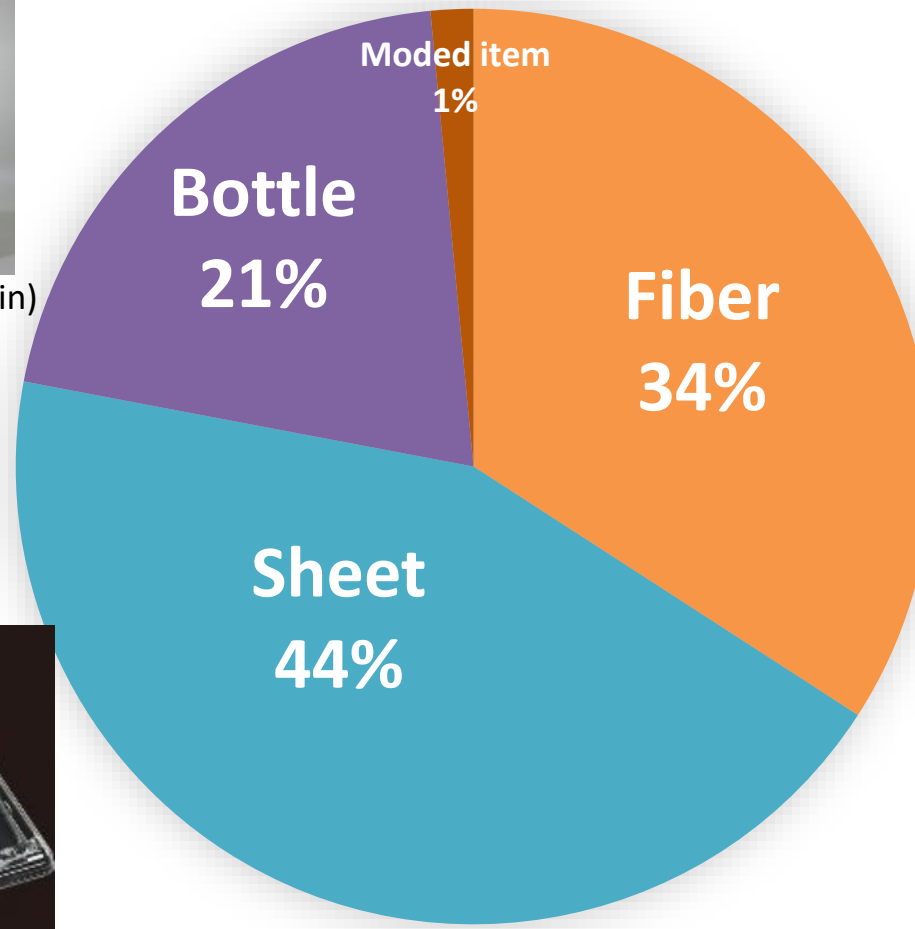
(The Japan Containers and Packaging Recycling Association)

# Recycling of PET bottles

➤ Output: 100% as material recycling (Sheet, Fiber, Bottle etc)



(PET bottle with 100% recycled resin)



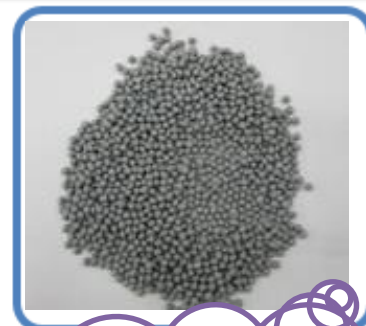
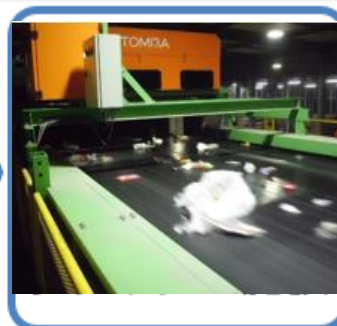
(Recycled PET tray for food)

(FY 2017)



# Collection & Recycling of Plastic Products with Packaging

- Model Projects in 7 cities (approx. 82600 people in total) in FY2017  
[Cities of Yokohama, Kawasaki, Osaka, Nagoya, Toyama, Hiroshima, Kitakyushu]



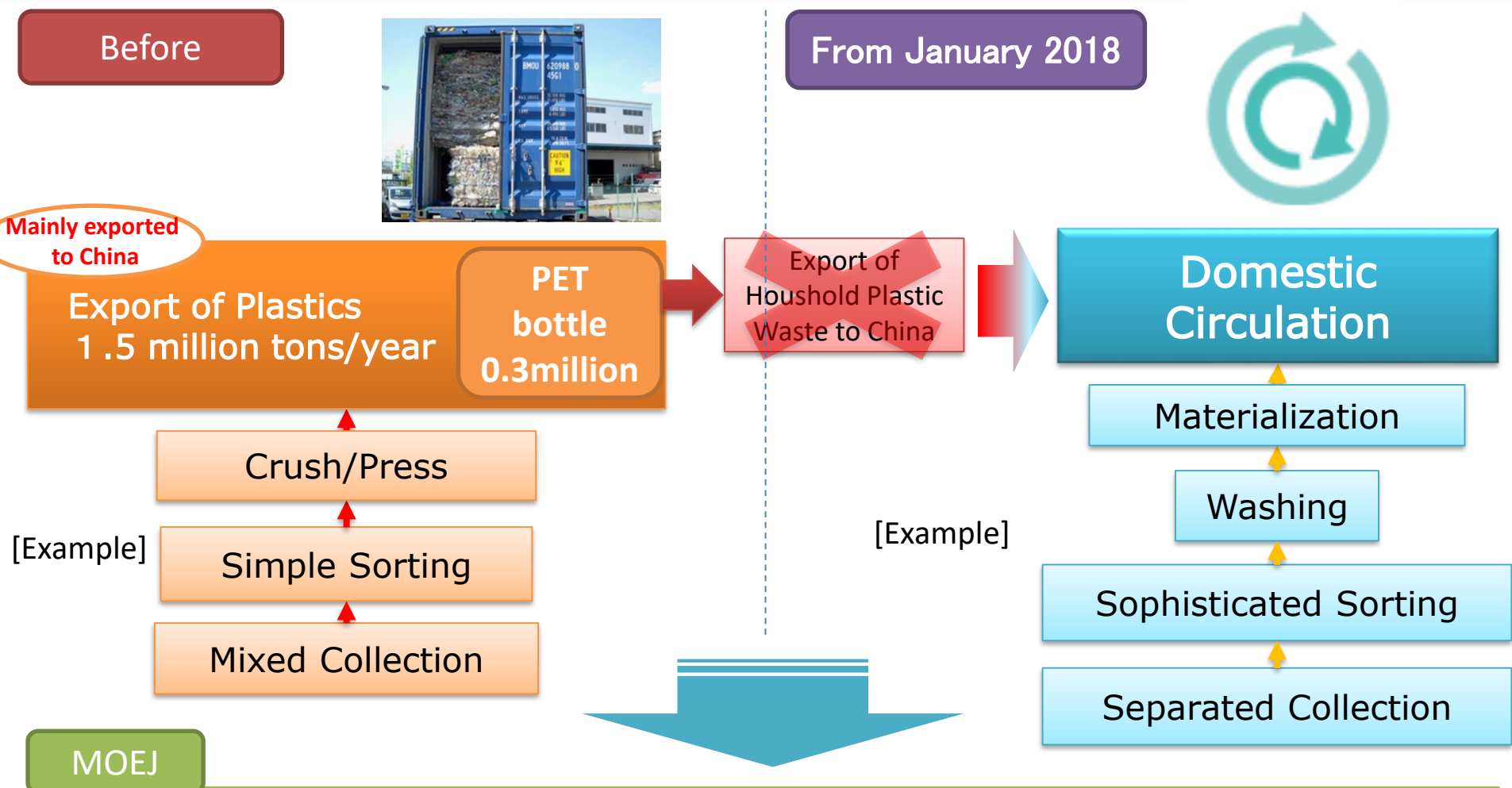
PP – 37.1%  
Multi – 19.4%  
PE – 9.5%  
PS – 3.3%  
ABS – 2.8%  
PVC – 2.7% etc

Combination of  
Mechanical,  
Chemical(feedstock)  
recycling &  
Thermal Recovery

Perspective	Result	Summary
Quantity	↑	+36% : 48.1t/month(packaging only)→65.6t/month
Quality	— / ↑	No problem with all recycling& recovery; same/better quality of recycled resins (compared to packaging only)
Efficiency	↑	Reduced the cost of overlapping sorting processes (between municipality and recycler)
Civilians' acceptance (by enquête : n=1416)	↑	74% regard as easier separation than packaging only; 81% say this separation system should be adopted

# Promotion of domestic resource circulation

- New Financial scheme corresponding to China's National Sword.



- Financial support for upgrading domestic recycling (Subsidy ½ for new facilities)
- No limit subjects (waste emitters, sorters, recyclers, compounders, molders OK)
- Budget: \$4million in FY2017 → \$15million in FY2018

# Public Procurement

- Strong incentives for 3Rs of plastics
  - ✓ Actions for reduction
  - ✓ Use reusable goods & recycled materials

## Law Concerning the Promotion of Procurement of Eco-Friendly Goods and Services

- **Mandatory** for the national government
- Obligatory to **make effort** for local governments

### 1.Reduction

- **[Retail businesses]** charge of plastic bags / reduction of packaging waste

### 2.Reuse

- **[Cafeteria]** use reusable tableware



(e.g. reusable cup)

### 3.Recycling

- **[Stationery]** >40% as recycled plastic; >20% as post-consumer plastic
- **[Office Furniture]** >10% as recycled plastic or >25% as bio-plastic
- **[Computers]** >40% as recycled plastic
- **[Uniforms, Interior Fixtures]** >25% as recycled/bio plastic etc

# Further challenges for resource circulation

- Huge potentials on 1) reduction 2) quantity 3) efficiency 4) market

## 1.Reduction



Reduction of environmentally harmful plastics

- Minimize – use of plastic bags/packageging

## 2.Quantity



Collection & recycling of unutilized plastics

(\*1.73 million tons)

- Collect - plastic goods & other recyclable plastics
- Optimize - combination of recycling & recovery

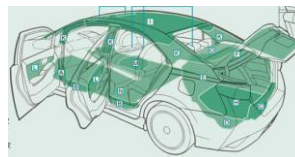
## 3.Efficiency



Efficient 3Rs system

- Integrate – citizens' separation & industrial sorting
- Exceed - vertically segmented recycling laws  
(\*packaging, automobile, home appliance, small home appliance)

## 4. Market



Activation of Recycled/Bio plastic market

- Incentives - goods made of recycled/bio plastics  
(e.g. Discount on recycling fee for recycled/bio resin-used car)

# Resource Circulation Strategy for Plastics

- Under proposal: in the draft of New Plan for a Sound Material-Cycle Society
- To be covered: Reduction, Reuse and Recycling of plastics;

## Basic Principle

- ⊖ Corresponding to various challenges including Resource & Waste restriction, Marine Litter, Climate Change
- ⊖ Establishing a Sustainable Society & handing over Rich Environment to the Next Generation
- ⊗ Reducing the dependence on non-renewable resources & shifting to renewable resources
- ④ Collecting used resources thoroughly & re-utilizing (reusing and recycling) them many times with consideration on economic and technological feasibility

## Concrete Measures

1

Reduction in the use of plastics contributing to lower environmental impacts, such as the reduction of single-use packaging and products

2

Collection and Recycling of used plastic resources like un-utilized plastics in the radical, effective and efficient manners

3

Improvement in the Practicality of Bio-plastics and ;  
Replacement fossil-fuel based plastics with Bio-Plastics



# Thank you so much for your attention ありがとうございました



## Mottainai (もったいない)

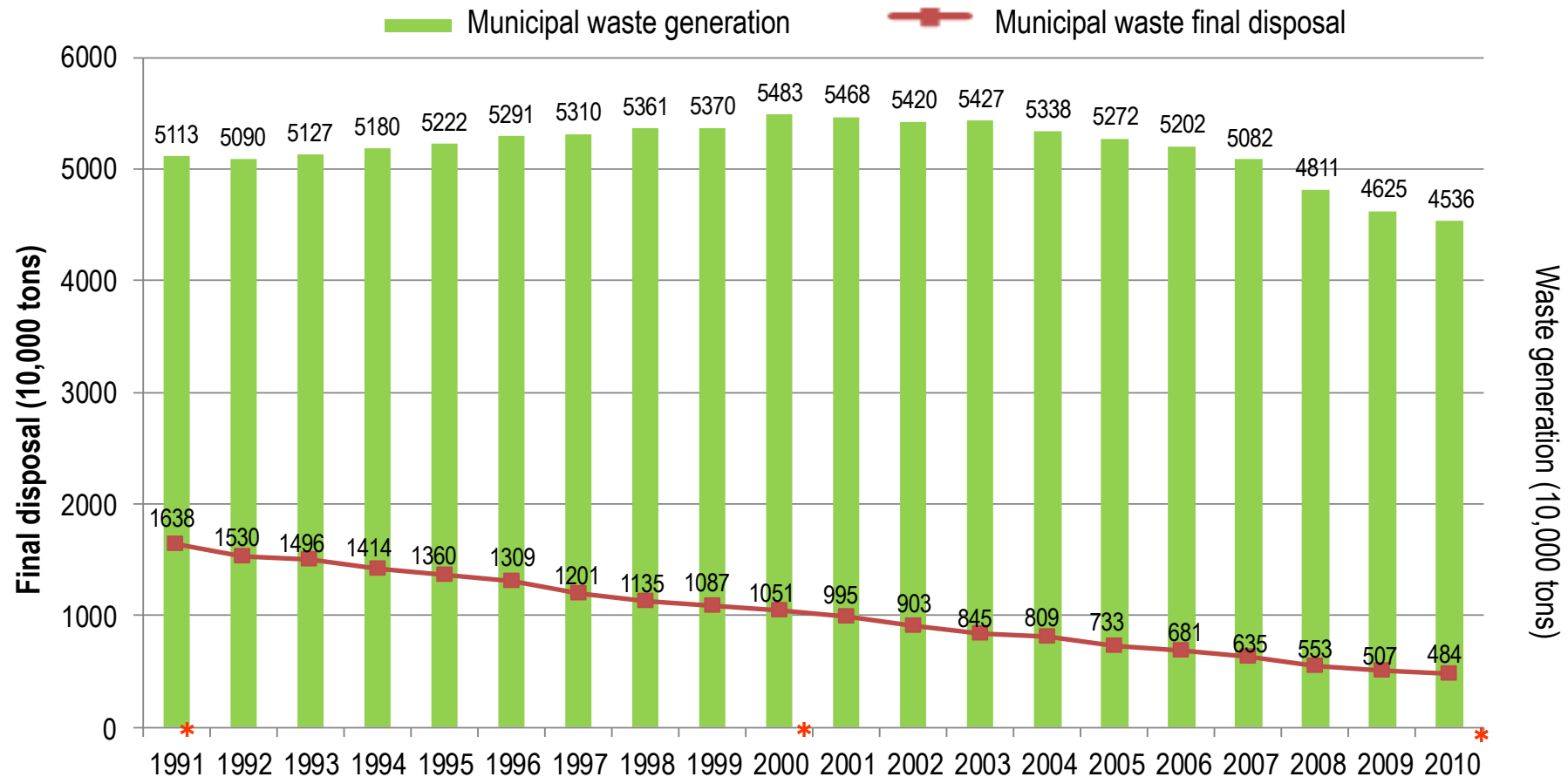
- Japanese cultural word: a sense of worthiness and regret wastefulness
- Exclamation when something useful is wasted - "Don't waste anything worthy"
- Kenyan environmentalist Wangari Maathai used *Mottainai* as a slogan for the four Rs : reduce, reuse, recycle and repair.  
*"We should all use limited resources effectively and share them fairly if we are to avert wars arising from disputes over natural resources."*

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# Changes in municipal waste generation and final disposal

The generation of municipal waste continues to decrease after recording a peak of 548.3 million tons in 2010. The amount of final disposal tends to decrease along with progress in recycling and reduction of waste generation.

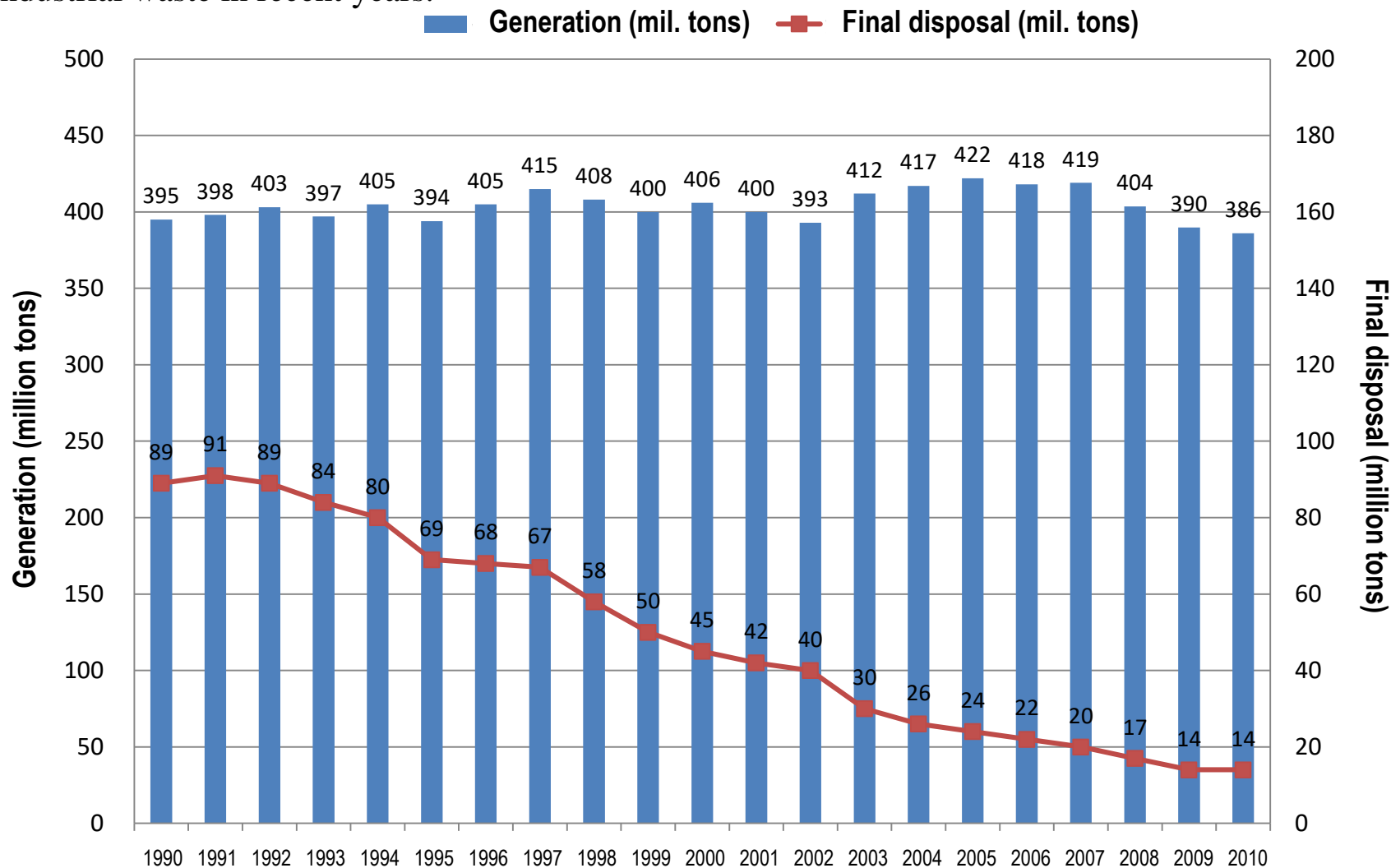


\* Waste generation per day per head (g/person-day)

- 1991	1,118	(g/person-day)
- 2000	1,185	(g/person-day)
- 2010	976	(g/person-day)

# Changes in industrial waste generation and final disposal

The total generation of industrial waste has remained 390 million tons in 2010, almost unchanged since 1990. The final disposal tends to decrease with progress in recycling and a declining tendency of industrial waste in recent years.



# History of regulations related to waste management and recycling

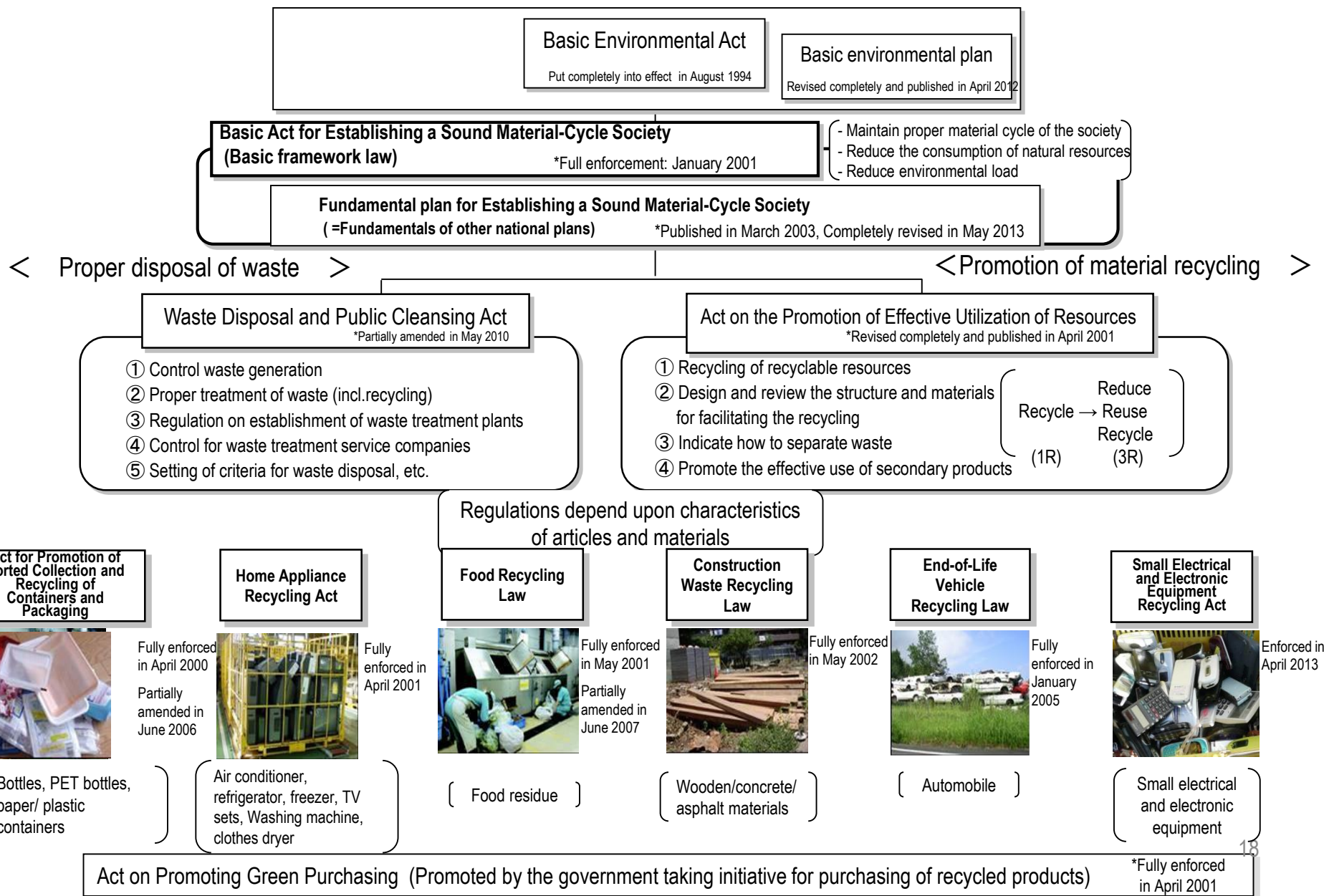
Period	Contents	Enactment of laws
Post war - 1950s	<ul style="list-style-type: none"> <li>- Waste treatment as a measure for environment and health protection</li> <li>- Conservation of healthy and comfortable living environment</li> </ul>	<ul style="list-style-type: none"> <li>- Public Cleansing Act (1954)</li> </ul>
1960s - 1970s	<ul style="list-style-type: none"> <li>- Amount of industrial waste increases along with the high economic growth and the problem of pollution comes to the fore.</li> <li>- Waste treatment as a measures for environment conservation</li> </ul>	<ul style="list-style-type: none"> <li>- Act on urgent measures for improvement of living environment (1963)</li> <li>- Waste Disposal and Public Cleansing Act (1970)</li> <li>- Amendment of the Waste Disposal and Public Cleansing Act (1976)</li> </ul>
1980s	<ul style="list-style-type: none"> <li>- Improvement of waste treatment plants is promoted</li> <li>- Environment conservation along with the waste treatment</li> </ul>	<ul style="list-style-type: none"> <li>- Act on Bay Area Marine and Environment Consolidation Centers (1981)</li> <li>- Law for Combine Household Wastewater Treatment Facility (1983)</li> </ul>
1990s	<ul style="list-style-type: none"> <li>- Waste disposal control and promotion of recycling</li> <li>- Establish various recycling systems</li> <li>- Countermeasures for hazardous substances (incl. dioxin)</li> <li>- Introduction of systems for proper waste treatment, to accommodate a large variety of kinds and characteristics of waste</li> </ul>	<ul style="list-style-type: none"> <li>- Amendment of the Waste Disposal and Public Cleansing Act (1991)</li> <li>- Act on Promotion of Development of Specified Facilities for the Disposal of Industrial Waste (1992)</li> <li>- Basic Environmental Act (1993)</li> <li>- Act for Promotion of Sorted Collection and Recycling of Containers and Packaging (1995)</li> <li>- Amendment of the Waste Disposal and Public Cleansing Act (1997)</li> <li>- Home Appliance Recycling Act (1998)</li> <li>- Act on Special Measures against Dioxins (1999)</li> </ul>
2000 -	<ul style="list-style-type: none"> <li>- 3R Promotion for building of a sound material-cycle society</li> <li>- Reinforcement of measures of industrial waste treatment</li> <li>- Control enhancement of illegal waste disposals</li> </ul>	<ul style="list-style-type: none"> <li>- Basic Act on Establishing a Sound Material-Cycle Society (2000)</li> <li>- Law for the Promotion of the construction material recycling and Utilization of Recyclable Food Resources (2000)</li> <li>- Amendment of the Waste Disposal and Public Cleansing Act (2000)</li> <li>- Act Concerning Special Measures Against PCB Waste (2001)</li> <li>- End-of-Life Vehicle Recycling Law (2002)</li> <li>- Act on Special Measures concerning Removal of Environmental Problems Caused by Industrial Wastes (2003)</li> <li>- Amendment of the Waste Disposal and Public Cleansing Act (2003 - 2006, 2010)</li> <li>- Small Electrical and Electronic Equipment Recycling Act (2013)</li> </ul>

Health

Pollution / environment

Resources/sound material-cycle society

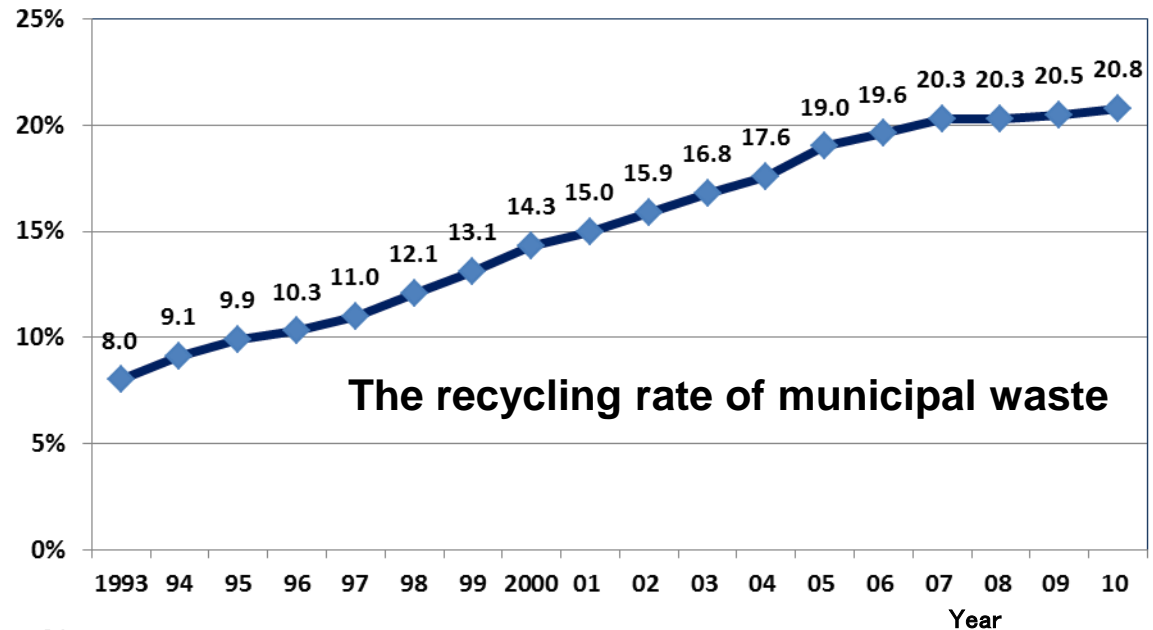
# Legal system for building a sound material-cycle society





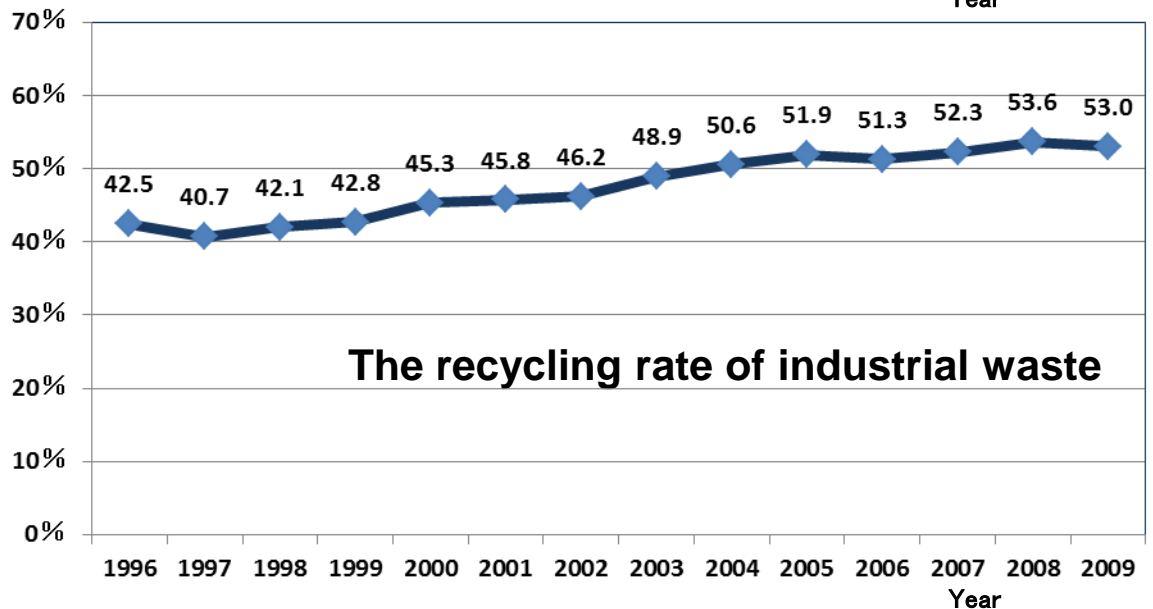
▶ **The recycling rate of municipal waste is 20.8% (FY2010).**

The recycling rate of municipal waste has been rising steadily, and exceeded 20% in both FY2007 and FY2008.



▶ **The recycling rate of industrial waste is 53.0% (FY2009).**

The recycling rate of industrial waste, which has been rising gradually, exceeded 50% since FY2004.

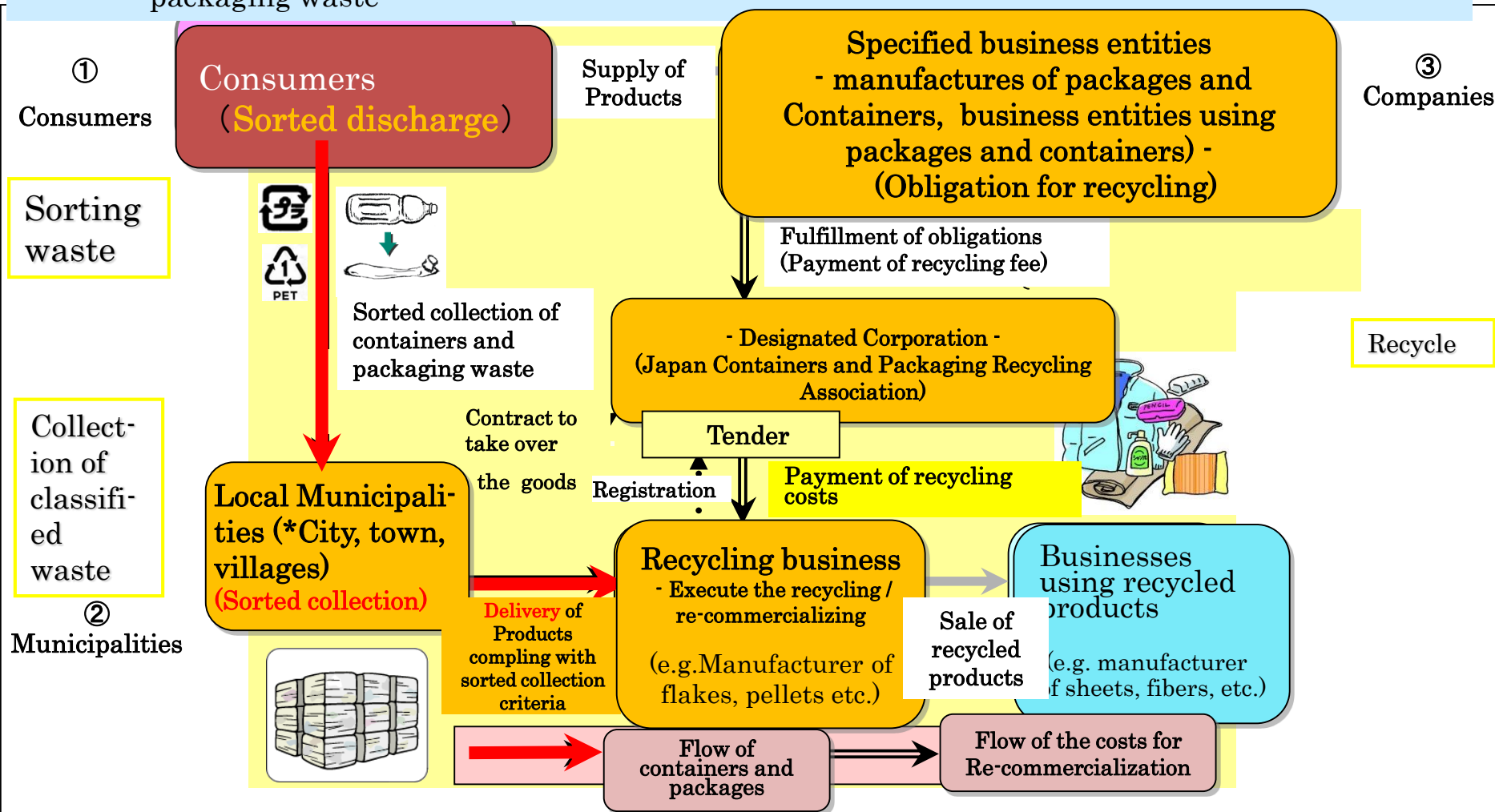


# Containers and packaging waste's recycling scheme

(Promulgation in June 1995; Full enforcement in April 1997)

The following policies were created so that each consumer, municipalities, businesses will have their own roles in:

- ① Sorting through waste ② Collection of classified waste ③ Recycle of containers and packaging waste



# Summary of Container and Packaging Recycling Law

Appendix

(announced June 1995, enacted April 1997)

The following policies were created so that each of consumer, municipalities, businesses will have their own roles in:

①Sorting through the waste ②Collection of classified waste ③Recycling of containers and packages

## Duty

- Consumer: Sorting through the waste
- Municipalities: Collection of classified waste
- Businesses: Recycling



## Target object

- Container and packaging: a product's containers and packages, ( - which will be no longer needed if once separated from the said product - or, if the said product is consumed.)
- Container and packaging : specified containers + specified packages
- Container and packaging waste

## Exceptions

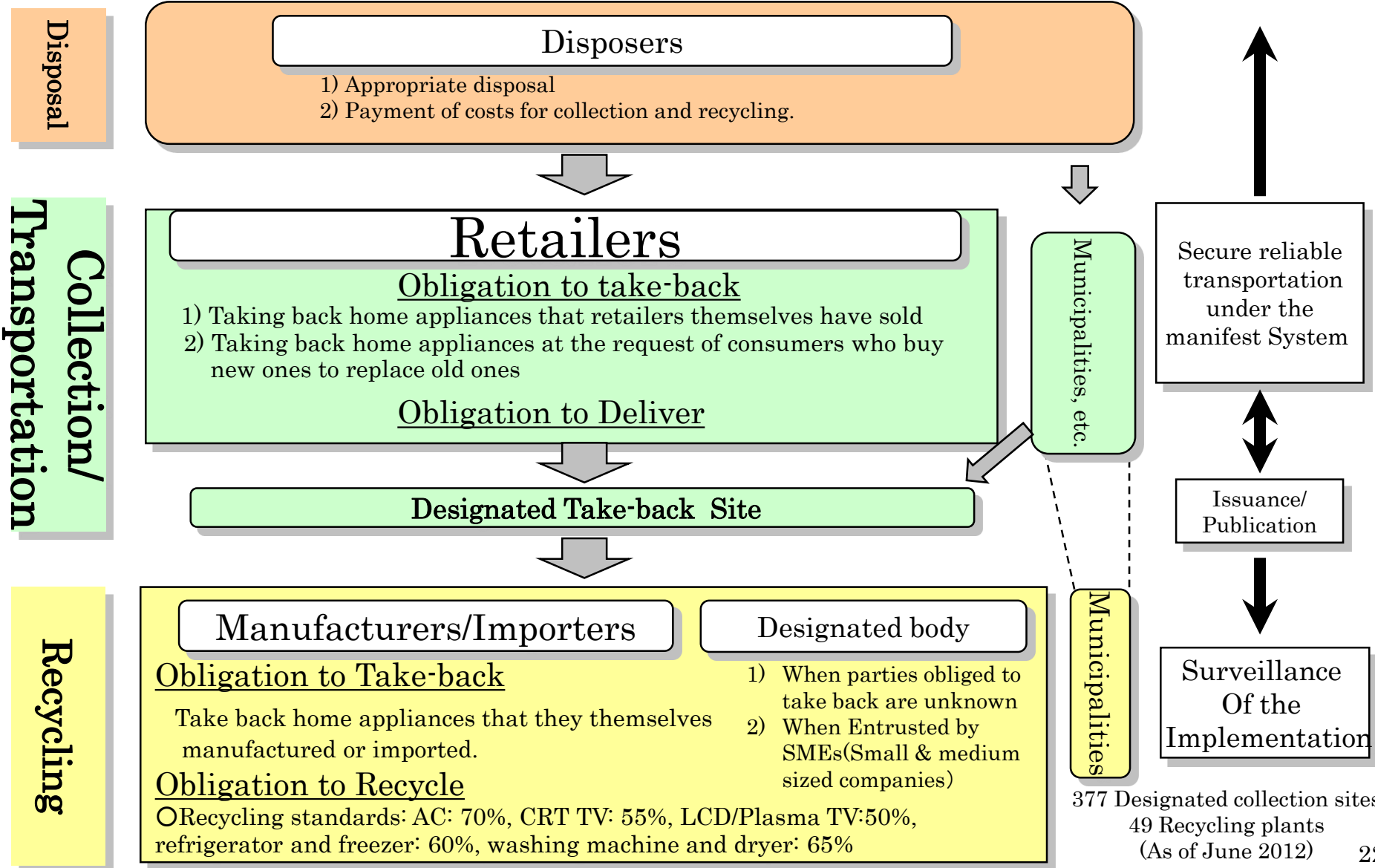
- Target object is limited to the general waste
- Permission not needed for specifically certified companies under the law.  
→ Permission not needed for the Designated corporation, Companies certified by the minister (and their contractors) under the Waste Disposal & Public Cleaning Law .

# Mechanism of Home Appliances Recycling Law

Target equipment: AC, TV (CRT, LCD, plasma TV sets\*),  
refrigerators, freezers, washing machines, dryers

(Promulgation June 1998, full enforcement Apr, 2001)

(\*) Portable TV, Car TV as well as bathroom TV are excluded



# Summary of Home Appliances Recycling Law

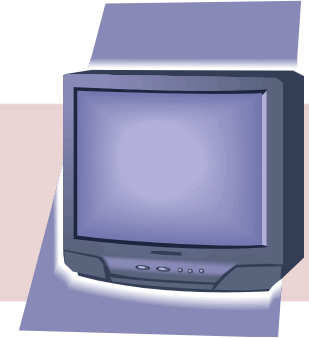
(Promulgated Jun.1998, Fully enforced Apr. 2001)

Consumers, retailers, manufacturers must conduct each of their roles:

①Bear the costs, ②Collect and transport ③Recycle the specified home appliances

## Duty

- Consumer: Appropriate disposal, as well as bearing the costs
- Retailer: Collection and transportation
- Manufacturer: Recycling



## Target Object

- Specified household appliances of post-consumer use: electrical appliances and other equipment, used by the general consumers in daily lives
- Specified household appliance waste (including general waste and industrial waste)



Target appliances: AC, TV (CRT)\*, refrigerator, freezer, washing machines (*\*LCD TV, plasma TV, dryers also included*)

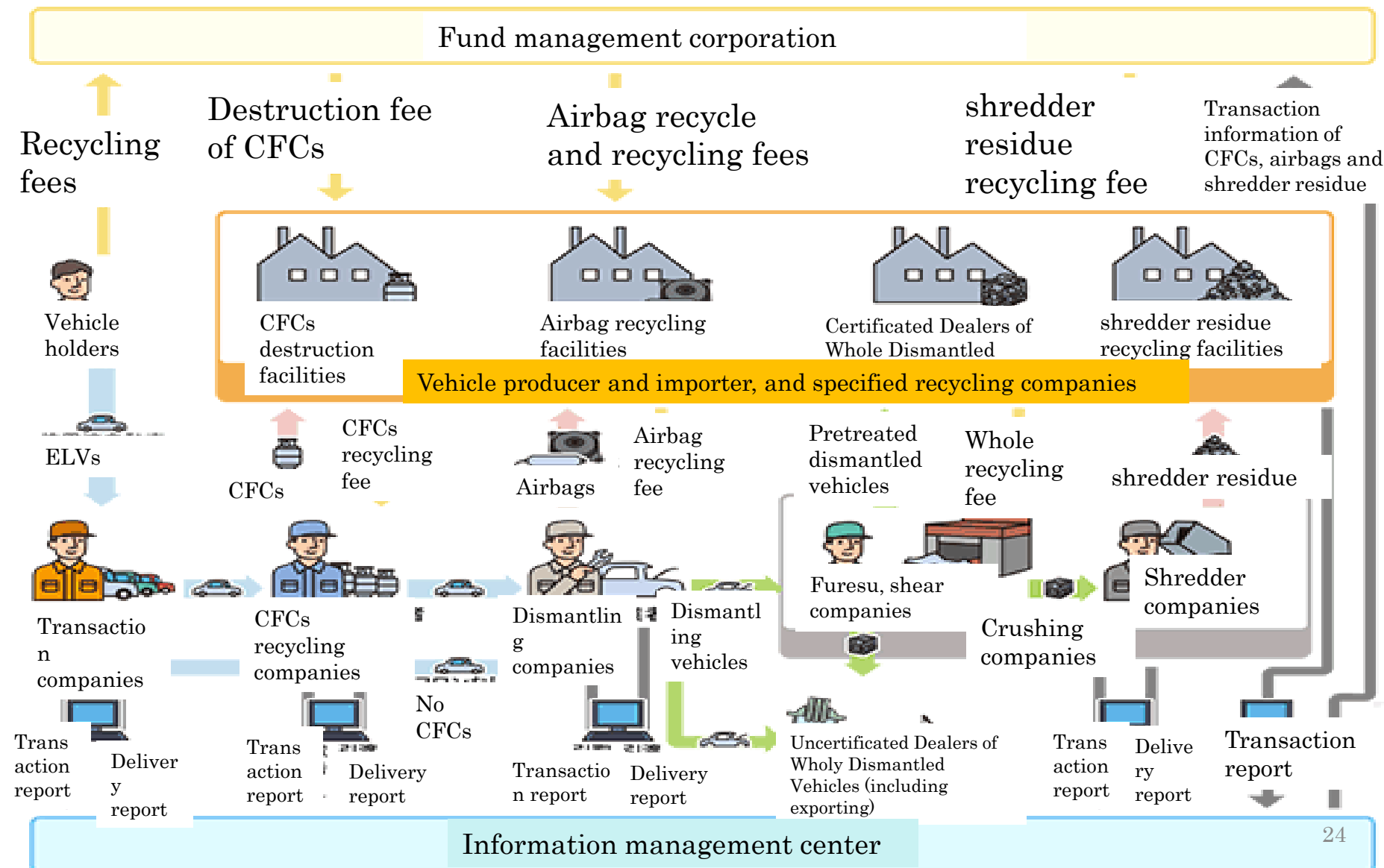
## Special exceptions

- If the company is certified by the minister under Home Appliances Recycling Law, permission is not required..
- \*It doesn't change the company's nature as subject to the law: obligation for waste disposal standards, or penalties are applied.



# Mechanism of Automobile Recycling Law

(July 2002 promulgated, January 2005 full-scale enforced)



# Summary of Automobile Recycling Law

(Promulgated in July 2002, enacted in January 2005)

Create a framework where owners, collection operators, fluorocarbon recovering operators, dismantling and shredder companies, automotive manufacturers must be under each of their roles: ①receive and hand over ②recycle used vehicles



## Duty

- Owners: Hand over to collection operators
- Collection operator: transfer from the final owner, transfer to dismantling company (Air conditioner units should be handed over to fluorocarbon recovery operators)
- Fluorocarbon Recovery Operator: receive from collection operators, recover fluorocarbons, deliver to dismantling company
- Dismantling and Shredder companies: Recycle ELV (used vehicles or dismantled vehicles)
- Automotive Manufacturers: Recycling (Parts Specified for Recycling)

## Target products

- Used vehicles: As for vehicles, those that have finished its use (Used parts, market dismantling for iron resources)
- Dismantled vehicles: Separate components, materials, and other useful parts that can be found by dismantling a used vehicle and the remaining materials after collection
- Parts Specified for Recycling: shredder residue (Automobile Shredder Residue), airbags (Parts Designated for Recovery), Fluorocarbons



Parts Specified for Recycling: shredder residue (Automobile shredder residue), airbags (Parts designated for recovery), fluorocarbons.

## Special exceptions

- Used vehicles are handled as both industrial and general waste
- According to the ELV Recycling Law, dismantling and shredding companies that receive permission does not need permission under the Waste Disposal Law. It is also not necessary to apply for an industrial waste manifesto.

# Small Home Appliance Recycling Law

- Legal framework to ensure stable recycling
  - Authorization of business operators by the Minister of the Environment and the Minister of Economy, Trade and Industry
  - Used small electronic devices collected by local governments being delivered to the authorized business operators
  - Exemption for the authorized business operators from obtaining permission based on the Waste Management and Public Cleansing Law

