3Rs & Waste Management in Tokyo

Sustainable Materials Management Division
Bureau of Environment
Tokyo Metropolitan Government

TOKYO METROPOLITAN GOVERNMENT 東京都

TODAY'S TOPIC

1. INTRODUCTION

1-1 WASTE/RECYCLING RELATED LAWS

1-2 CITY PROFILE

1-3 HISTORY OF WASTE IN TOKYO

2. 3RS AND WASTE MANAGEMENT IN TOKYO

2-1 MSW

2-2 INDUSTRIAL WASTE

2-3 TMG'S 5-YEAR PLAN

2-4 TOWARD 2020

– NEW WASTE MANAGEMENT PLAN –

3. CONCLUSION

1. INTRODUCTION

1-1 WASTE/RECYCLING RELATED LAWS

National Legislation

Basic Act for the Sound Material-cycle Society

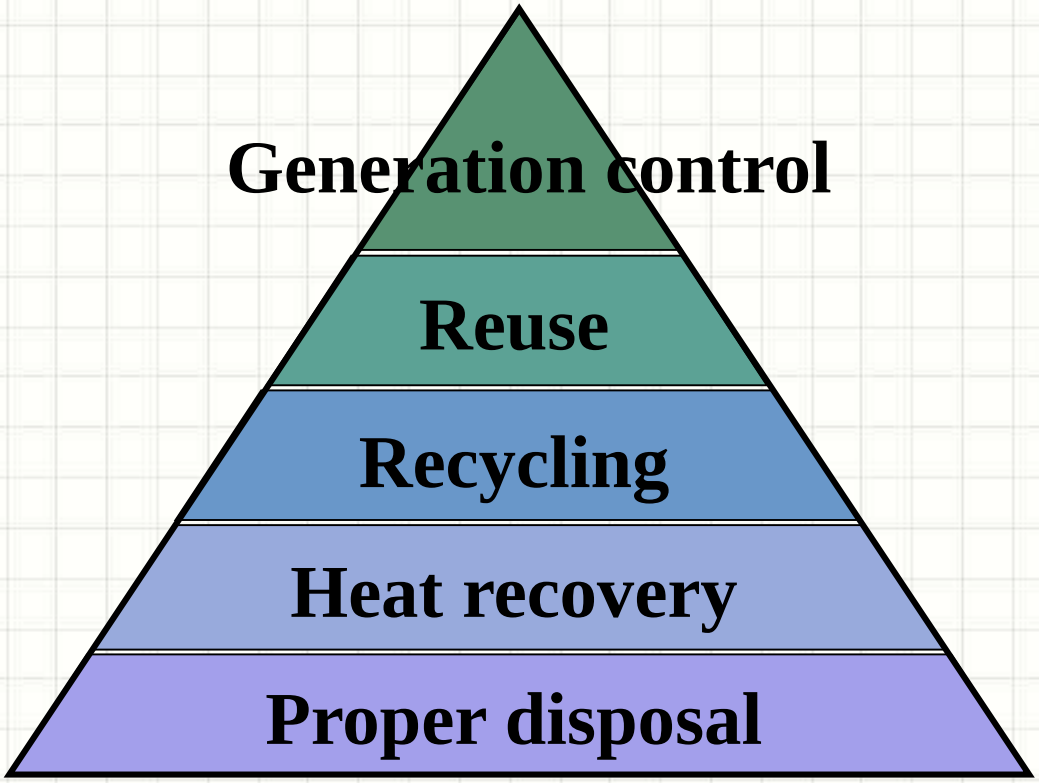
Waste Management Act

Effective Resource Utilization Act

Containers & Packaging Recycling Act
Home Appliance Recycling Act
Construction & Demolition Waste Recycling Act
Food Waste Recycling Act
End-of-Life Vehicle Recycling Act
Small WEEEs Recycling Act

5 PRIORITY RANKS

Basic Law for Establishing the Recycling-Based Society



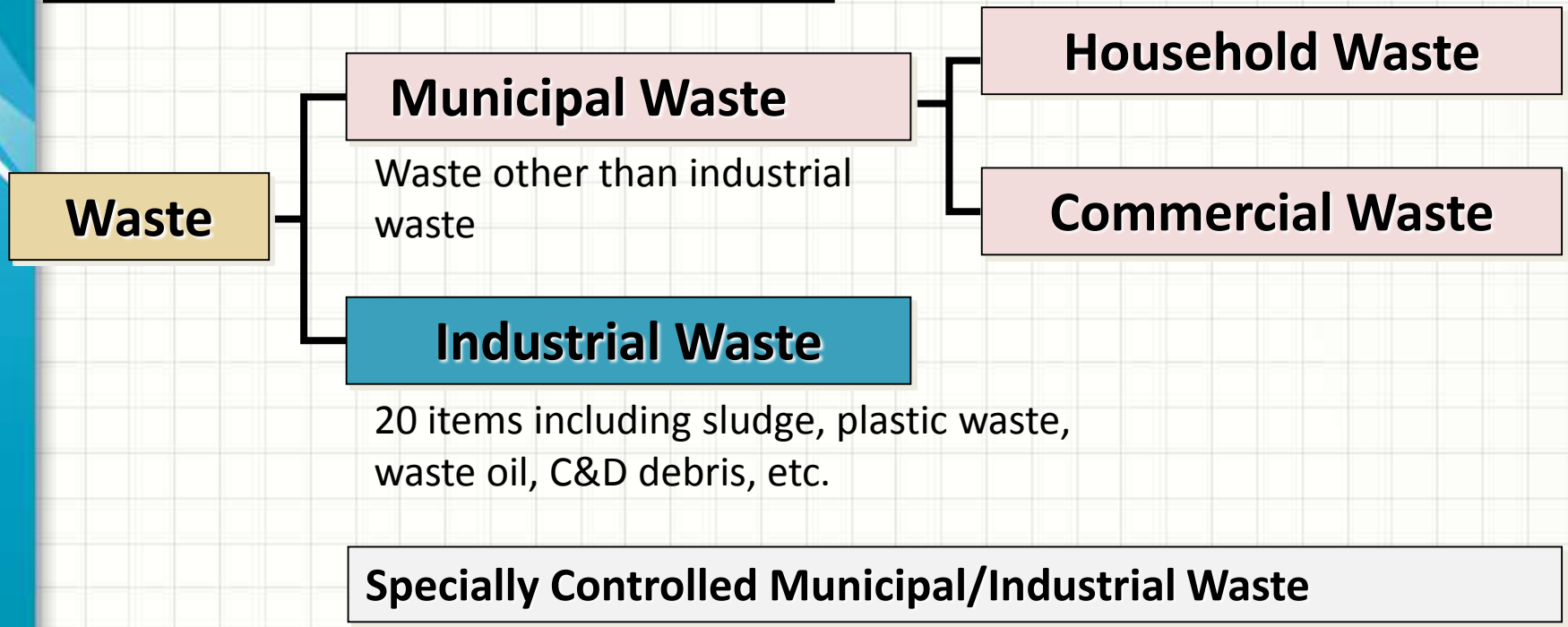
The hierarchy ranks waste management options according to their environmental benefits. These options should be taken, in this order, whenever environmentally beneficial and economically viable.

Waste Management Act

Definition of waste

Solid or liquid materials, useless for the owner and valueless in the market (Supreme Court decision)

Classification of waste



Waste Management Act

Roles of National and Local Governments

National Government

- Establish basic policies,
- Formulate waste disposal standards,
- Provide support to prefectures/municipalities, etc.

Prefectures

- Establish waste management plan,
- Provide control/guidance for appropriate disposal of industrial waste,
- License industrial waste disposal companies and approve construction of waste management facilities,
- Provide support to municipalities, etc.

Municipalities

- Establish municipal waste management plan,
- Treat municipal waste according to the plan,
- License general waste disposal companies, etc.

OBLIGATION OF MAKING A MSW DISPOSAL PLAN

In the Waste Disposal and Public Cleansing Law

Prefectural Plan

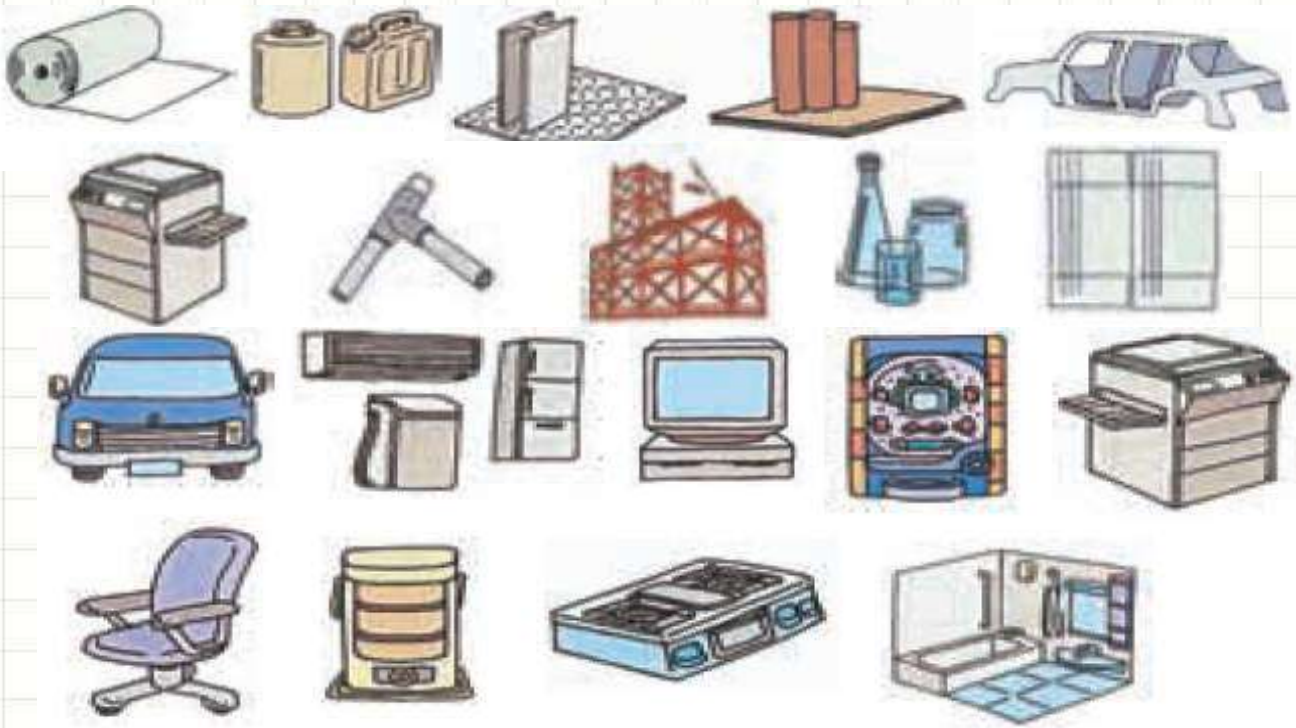
- Estimates amount of waste generation/treatment,
- Establishes basic policies related to reduction and treatment,
- Ensures proper management of general waste,
- Improves industrial waste management facilities, etc.

Municipal Plan

- Estimates amount of waste generation/treatment,
- Takes waste control measures,
- Classifies waste for sorting,
- Treats waste properly,
- Improves waste management facilities, etc.

LAW FOR
THE PROMOTION OF EFFECTIVE UTILIZATION OF RESOURCES

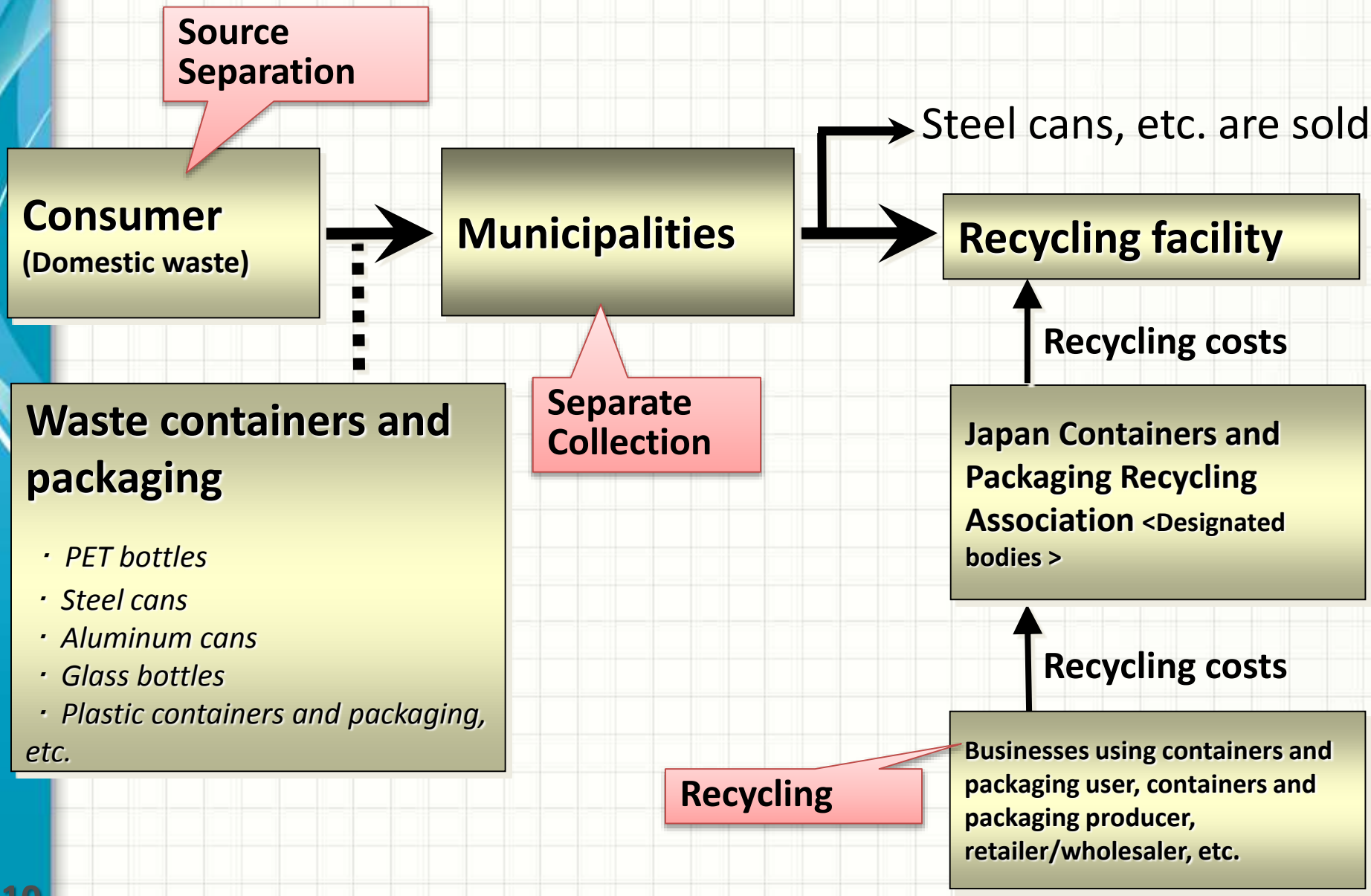
It states the standards of 3R efforts to be made by the producers



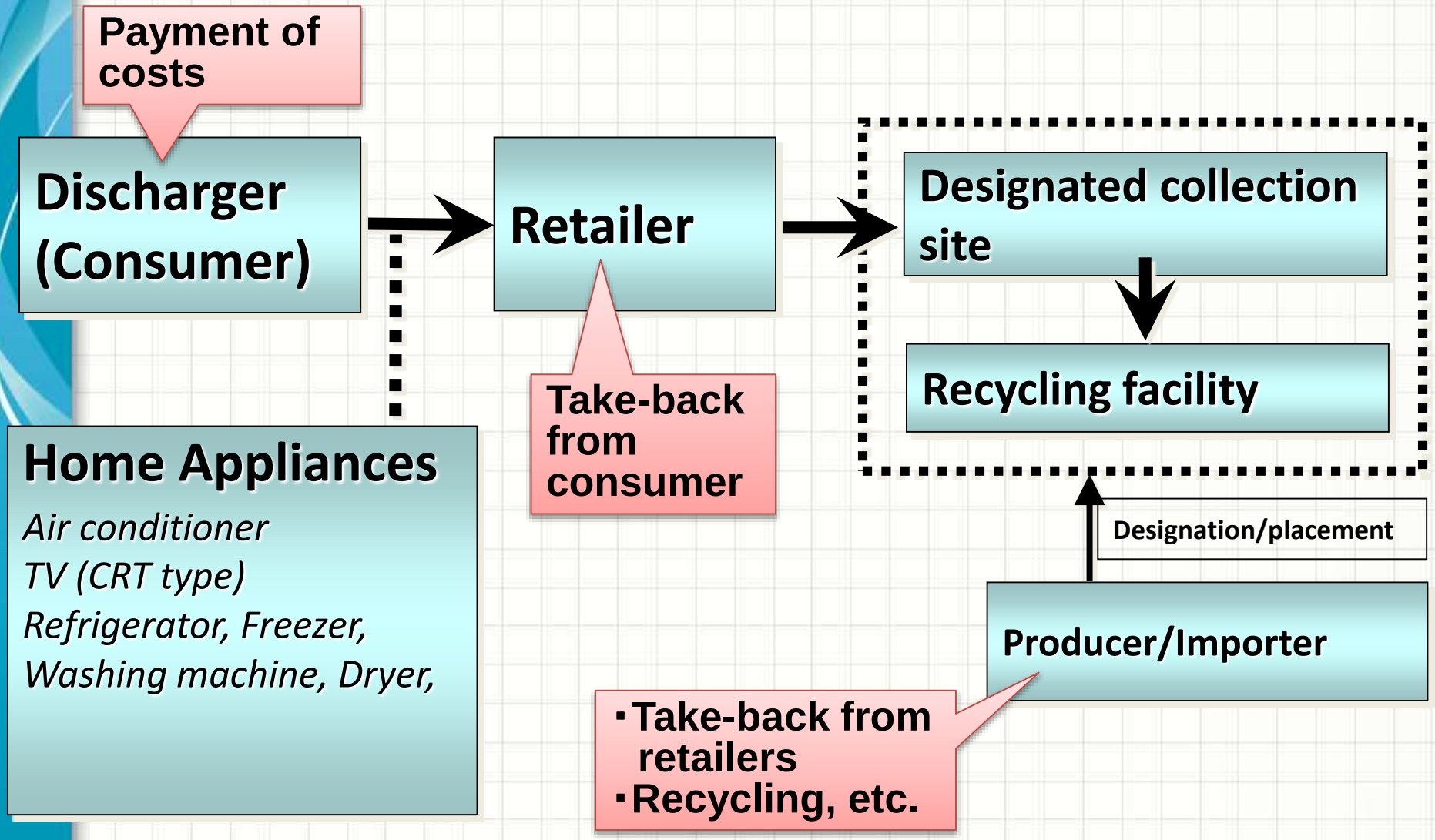
Regarding 69 products and 10 types of businesses.

The law covers approx. 50% of end-of-life products and waste in Japan

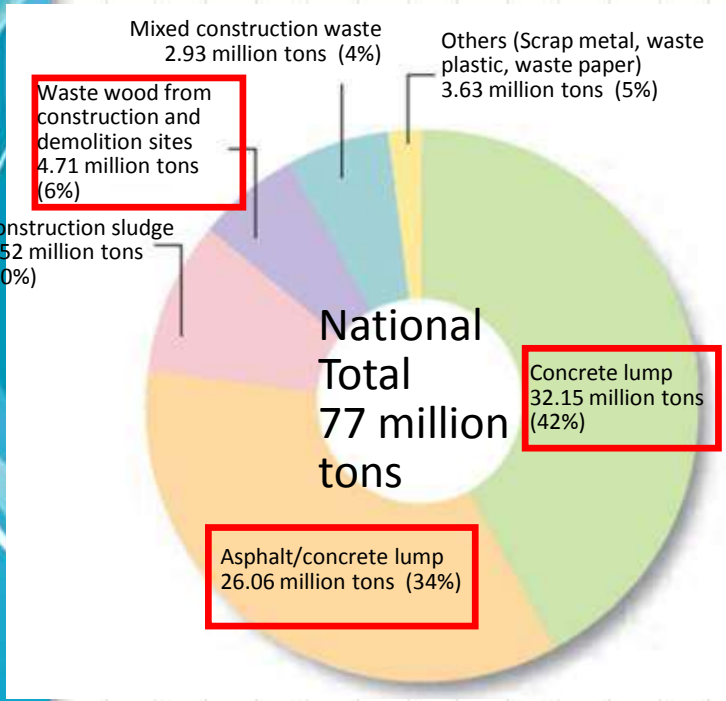
CONTAINERS AND PACKAGING RECYCLING LAW



HOME APPLIANCES RECYCLING LAW

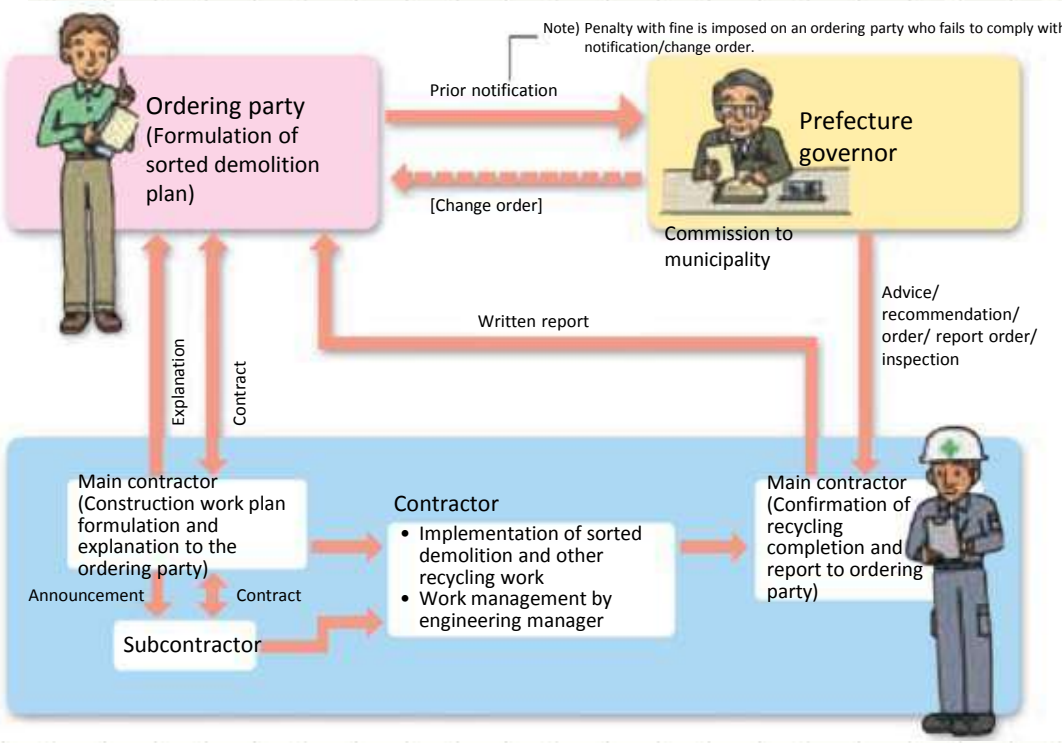


CONSTRUCTION MATERIALS RECYCLING LAW

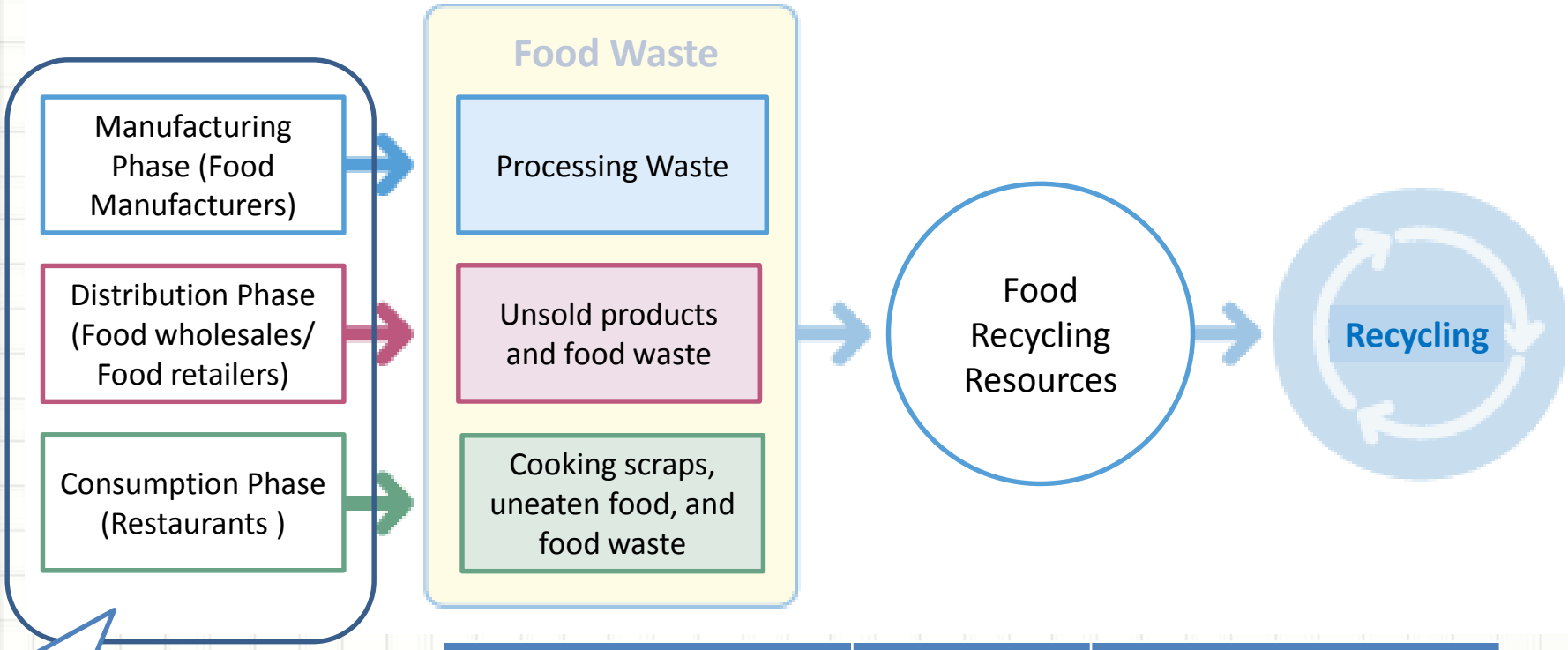


Items to be recycled

Order/implementation flow of sorted demolition/recycling



FOOD RECYCLING LAW（2001～）



Bodies that recycle their own food waste

Bodies	Target of 3R(~2019)	Actual Achievement(2012)
Food Manufacturers	95%	95%
Food Wholesalers	70%	58%
Food Retailers	55%	45%
Restaurants	50%	24%

END-OF-LIFE VEHICLE RECYCLING LAW

Vehicle owner

- Vehicle owner (Final owner)
  Pay recycling fee; Deliver an end-of-life vehicle to the receiver registered with the municipality

Related businesses

- Receiver
  Receives ELVs from the final owner, and delivers them to fluorocarbon recovery operators or dismantlers.
- Fluorocarbon recovery operator
  Recovers fluorocarbons and delivers it to automobile manufacturers or importers.
- Dismantler
  Dismantles ELVs, recovers airbags, and delivers them to automobile manufacturers or importers.
  Recovers fluorocarbons and delivers them to automobile manufacturers or importers.
- Shredder operator
  Shreds dismantled ELVs, and delivers shredder dust to automobile manufacturers or importers.

Automobile manufacturer / Importer

- Automobile manufacturer/importer

  When vehicles they produced or imported are scrapped, they take over shredder dust, airbags, and fluorocarbons generated from the ELVs, and recycle them.

SMALL ELECTRONIC DEVICES RECYCLING PROMOTION LAW

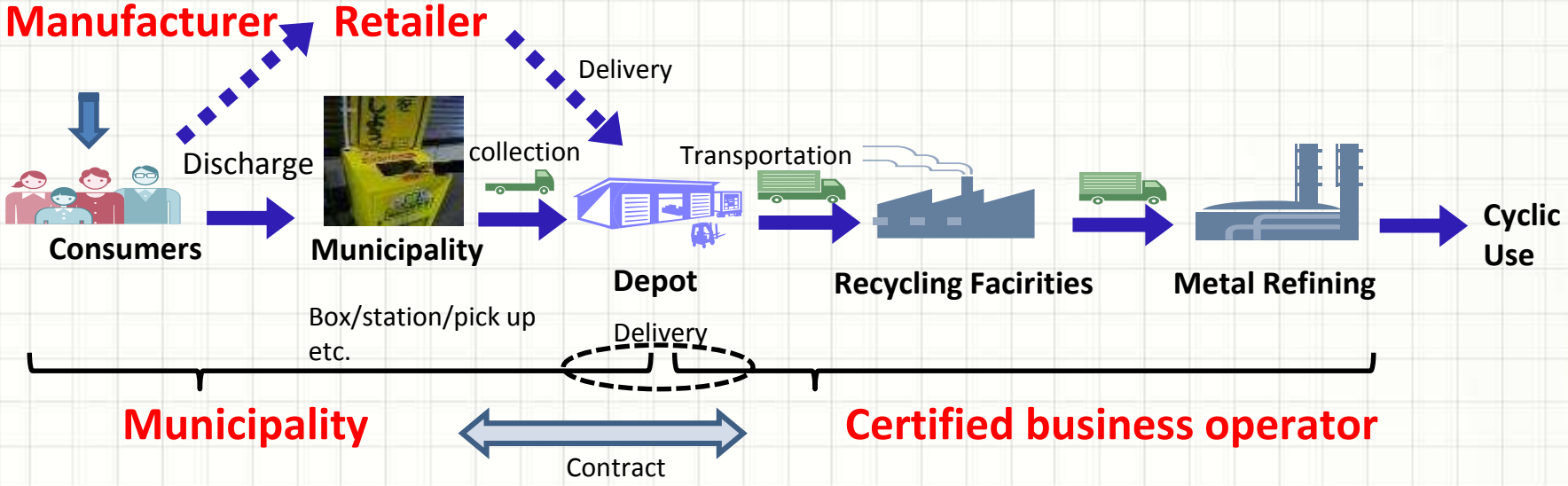
From April 2013

Background

Limitation of Natural Resources
-Escalating price of resources
Limitation of Environment
-Lack of land for final landfill site
-Proper management of the environment

Concept

Non mandatory scheme
Provide guideline, set up necessary procedure for each sector
In order to promote recycling of precious metals used in small electronic devices



1. INTRODUCTION

1-2 CITY PROFILE

TOKYO

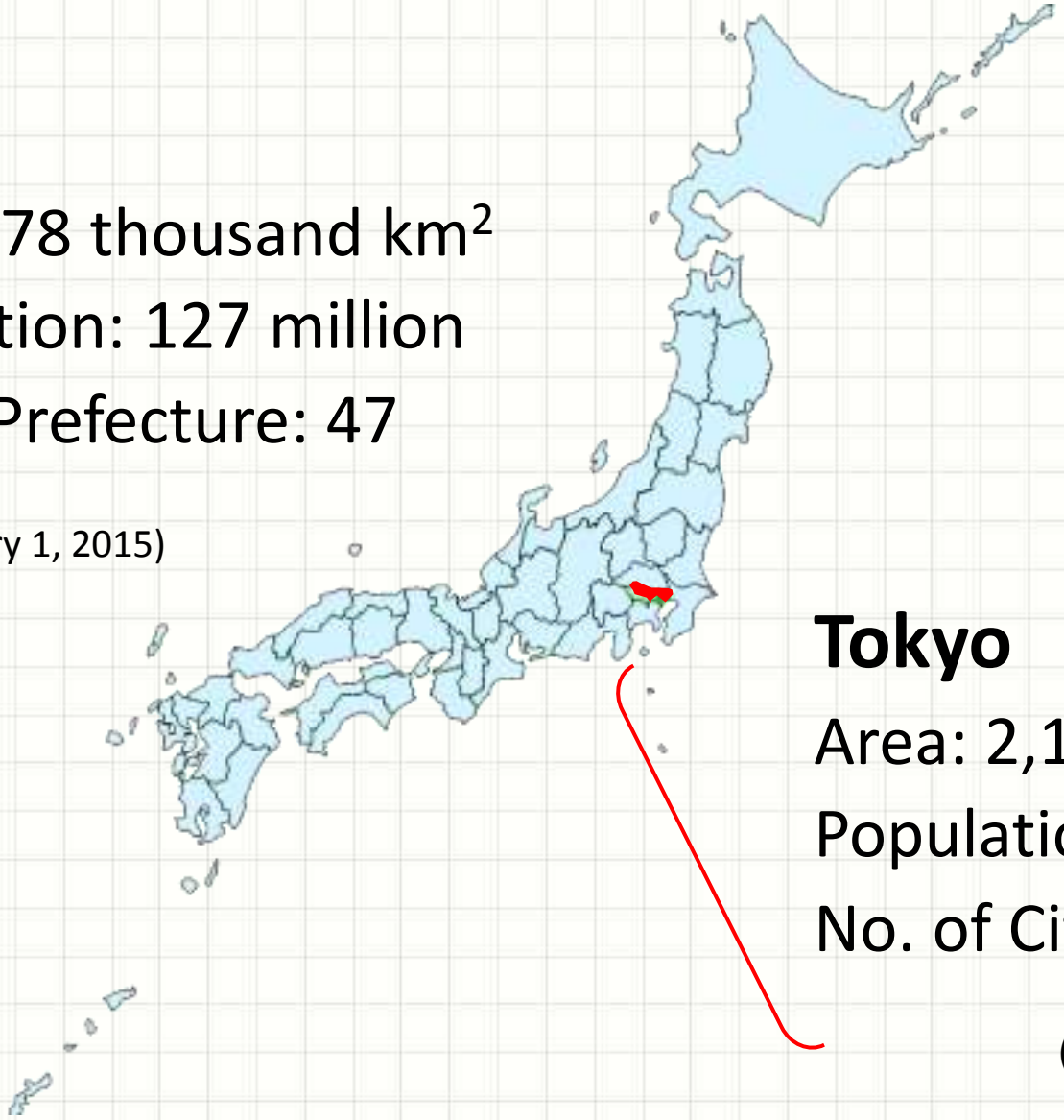
Japan

Area: 378 thousand km²

Population: 127 million

No. of Prefecture: 47

(as of January 1, 2015)



Tokyo

Area: 2,188 km²

Population: 13 million

No. of City: 62

(as of January 1, 2015)

TOKYO

Suburban area

“Tama area”

Area: 1160 km^2

Population: 4,192,937

No. of municipalities: 30

Central area

“23-city area”

Area: 622 km^2

Population: 9,002,488

No. of municipalities: 23

We are here.

Island area

“Izu/Ogasawara islands”

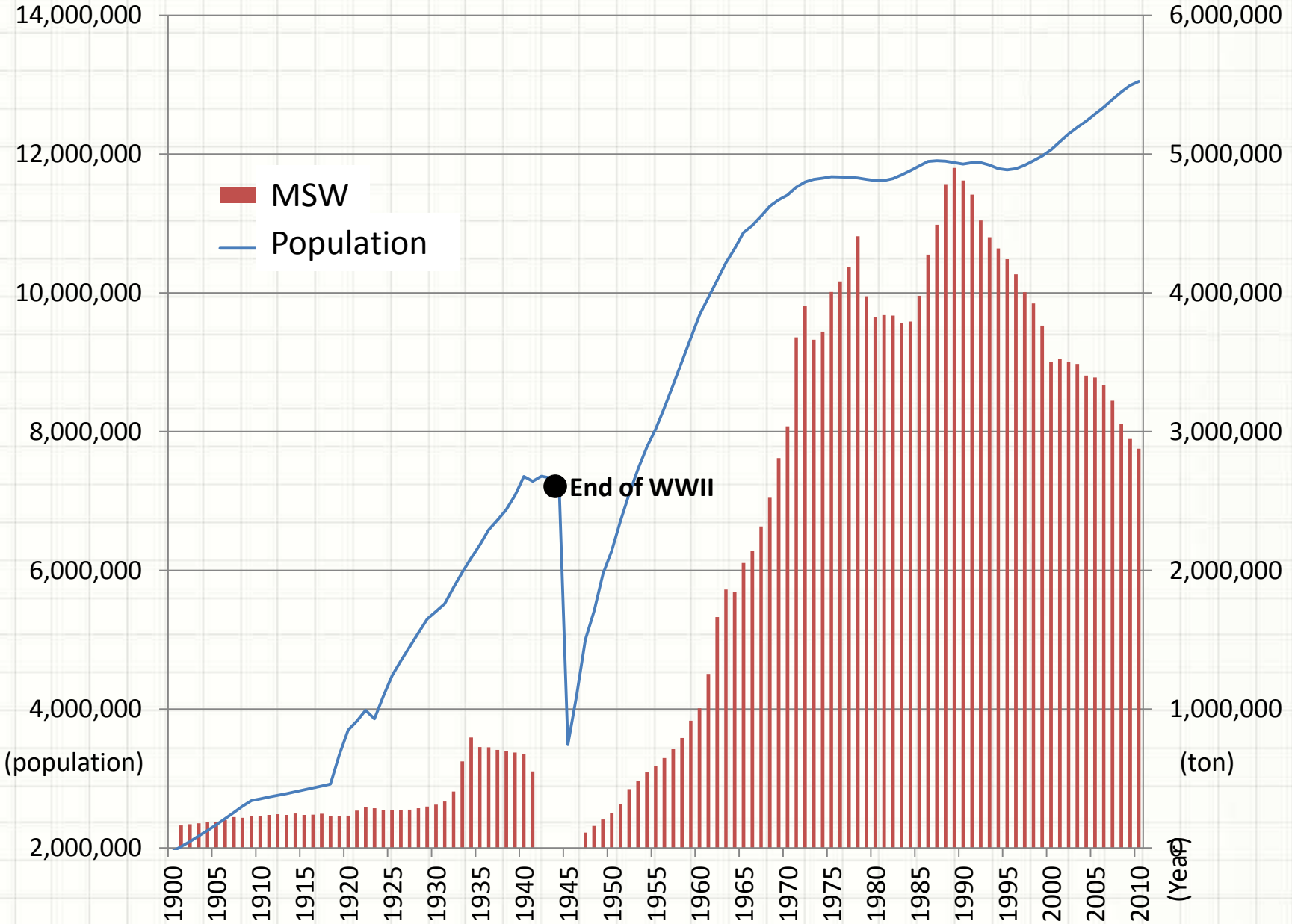
Area: 406 km^2

Population: 27,461

No. of municipalities: 9

As of 1st Jan 2013

Rapid increase of Population and MSW



【Biggest Challenge】 Lack of land for FDS

FDS IN TOKYO BAY

①1927-1962
②1957-1966
③1965-1974
④1973-1986
⑤1977-
⑥1984-1991
⑦1998-

1. INTRODUCTION

1-3 HISTORY OF WASTE IN TOKYO

OPPOSITION AGAINST INCINERATOR 1950's

Outbreak of Flies (1965)

Burning down flies on FDS in cooperation with fire department and polices.

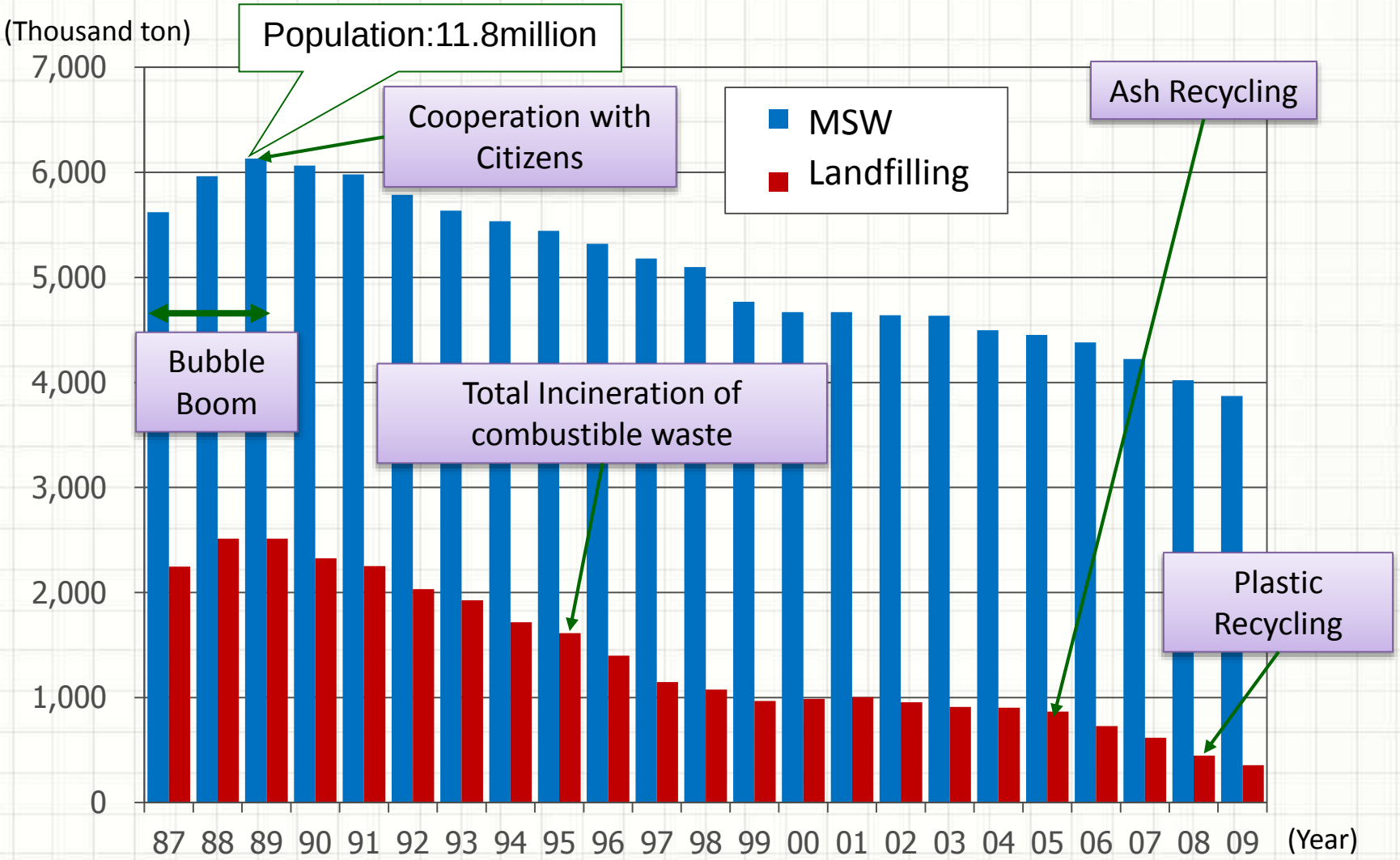
GARBAGE WAR 1970's

Don't bring garbage into my city

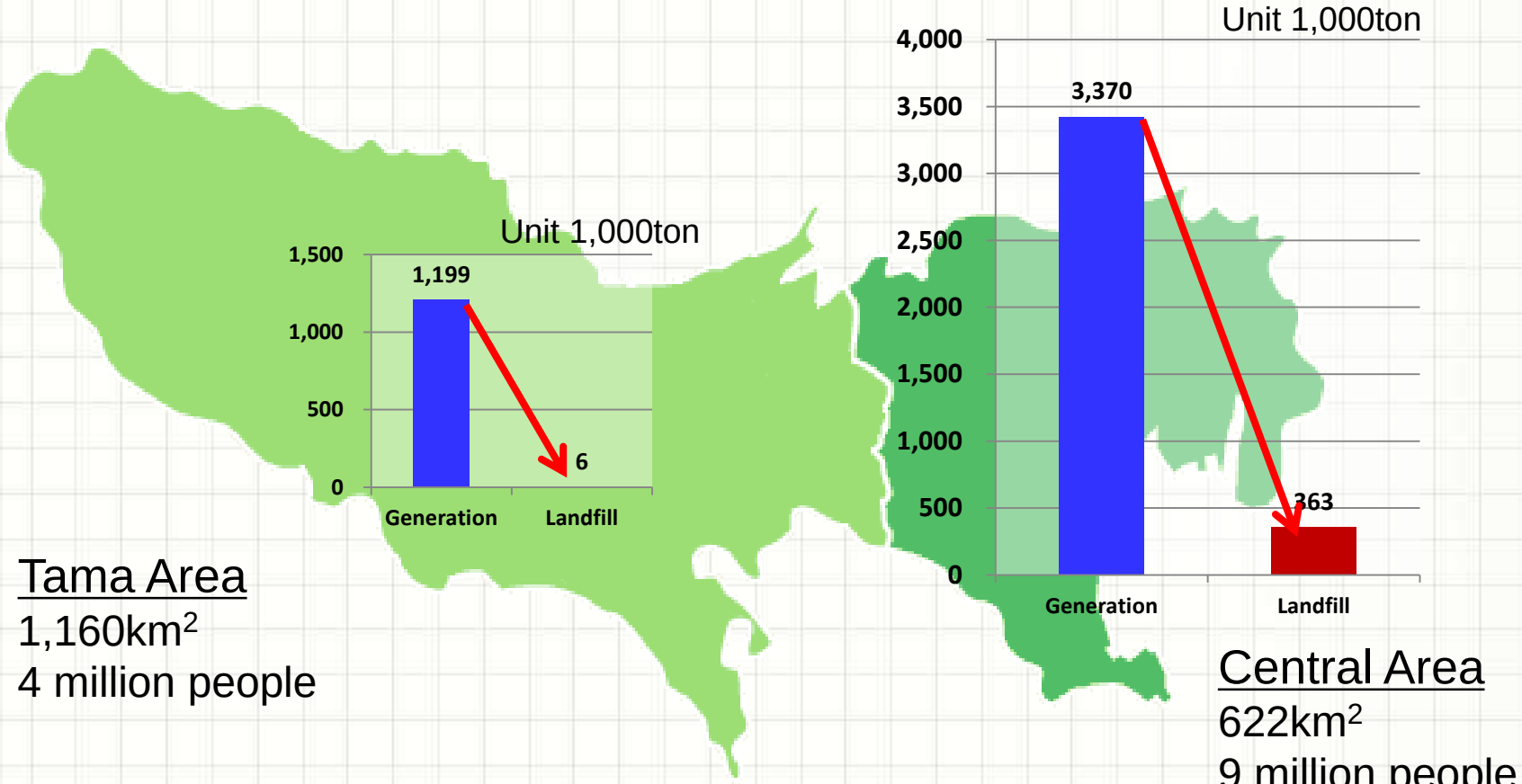
PEAK OF WASTE GENERATION (1989)

ILLEGAL DUMPING (C&D WASTE)

Reduction of Waste Generation and Final Disposal Amount



Reduction of Final Disposal Amount



Tama Area
1,160km^2
4 million people

Central Area
622km^2
9 million people

2. 3Rs and Waste Management in Tokyo

2-1 MSW

2-2 Industrial waste

2-3 TMG's 5-year Plan

2. 3Rs & Waste Management in Tokyo

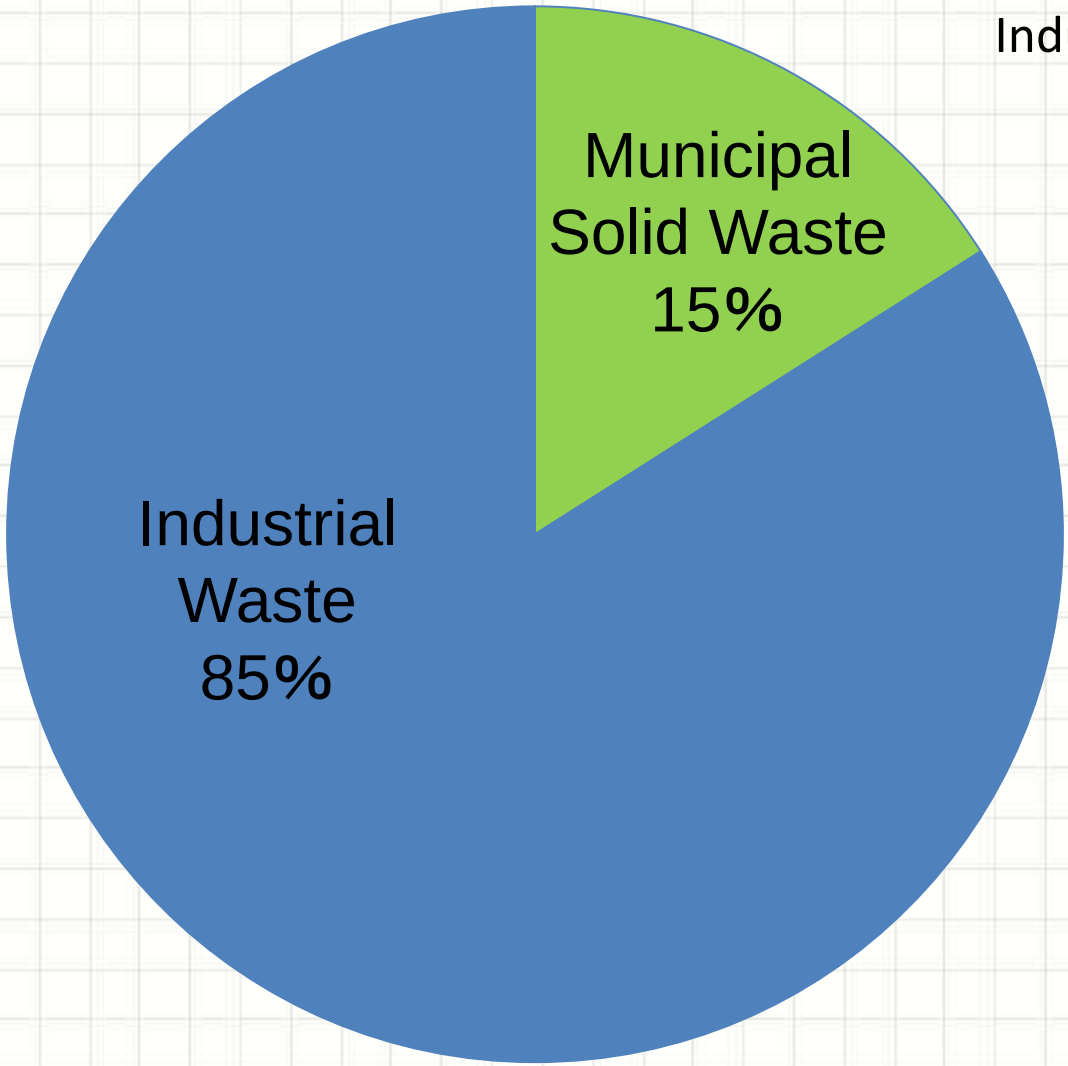
2-1 MSW

Waste Generation in Tokyo

79,100 t/day

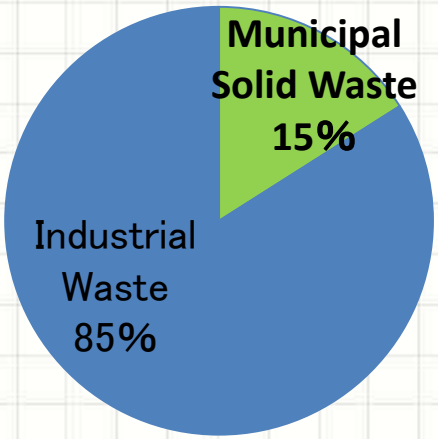
M S W : 11,700t/d

Industrial : 67,400t/d



In 2013

MSW IN TOKYO 11,700T/D



Waste generated by

- Households
- Small businesses

Managed and disposed by

Municipal Government

MSW MANAGEMENT

- Each municipal government has responsibility for MSW management
- Providing careful services to residents

The MSW Flow in Central Tokyo

Residents

Each city

Clean Authority of Tokyo23cities

Tokyo Metropolitan Government

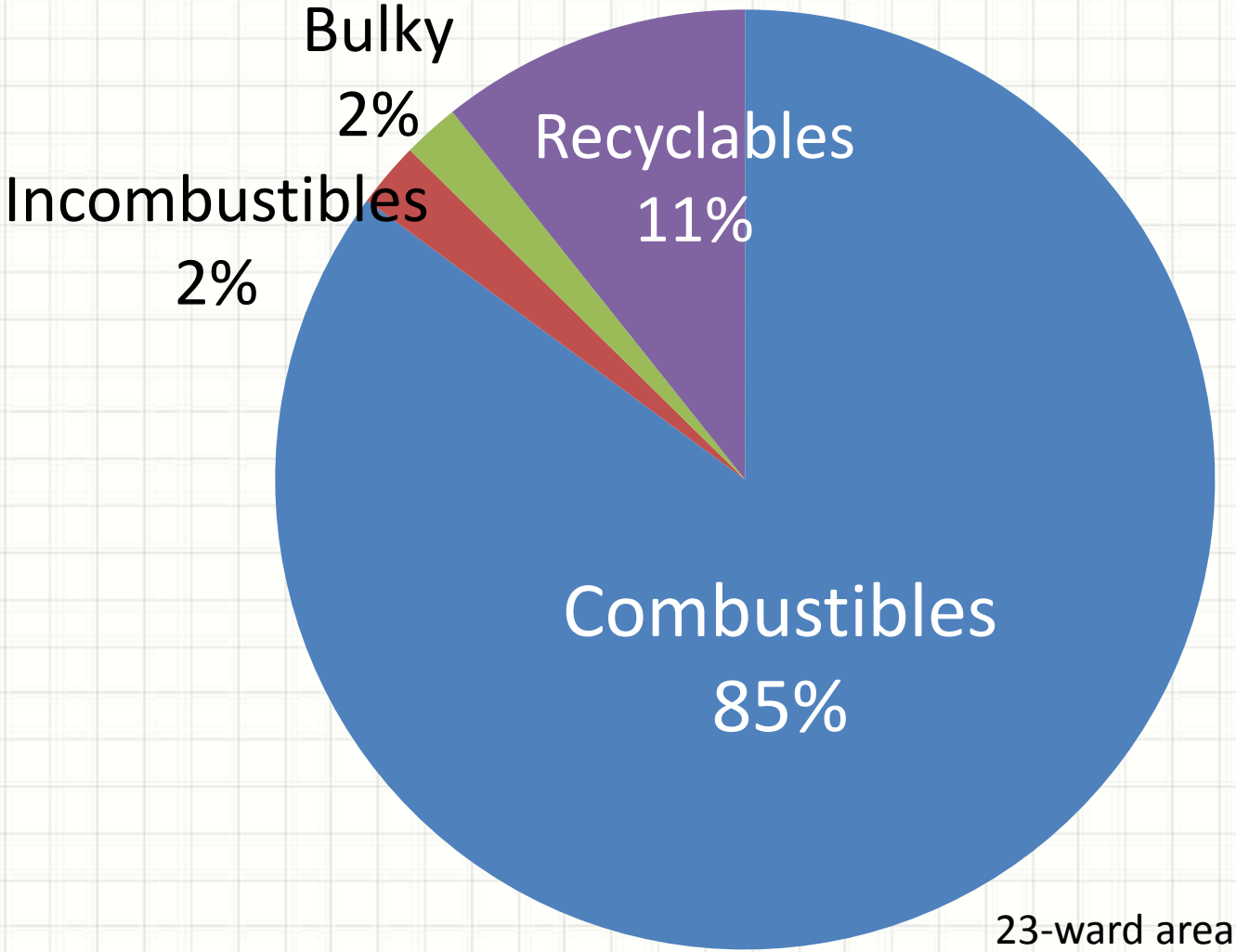
Source Separation &3Rs

Collection & Transport

Incineration & Shredding

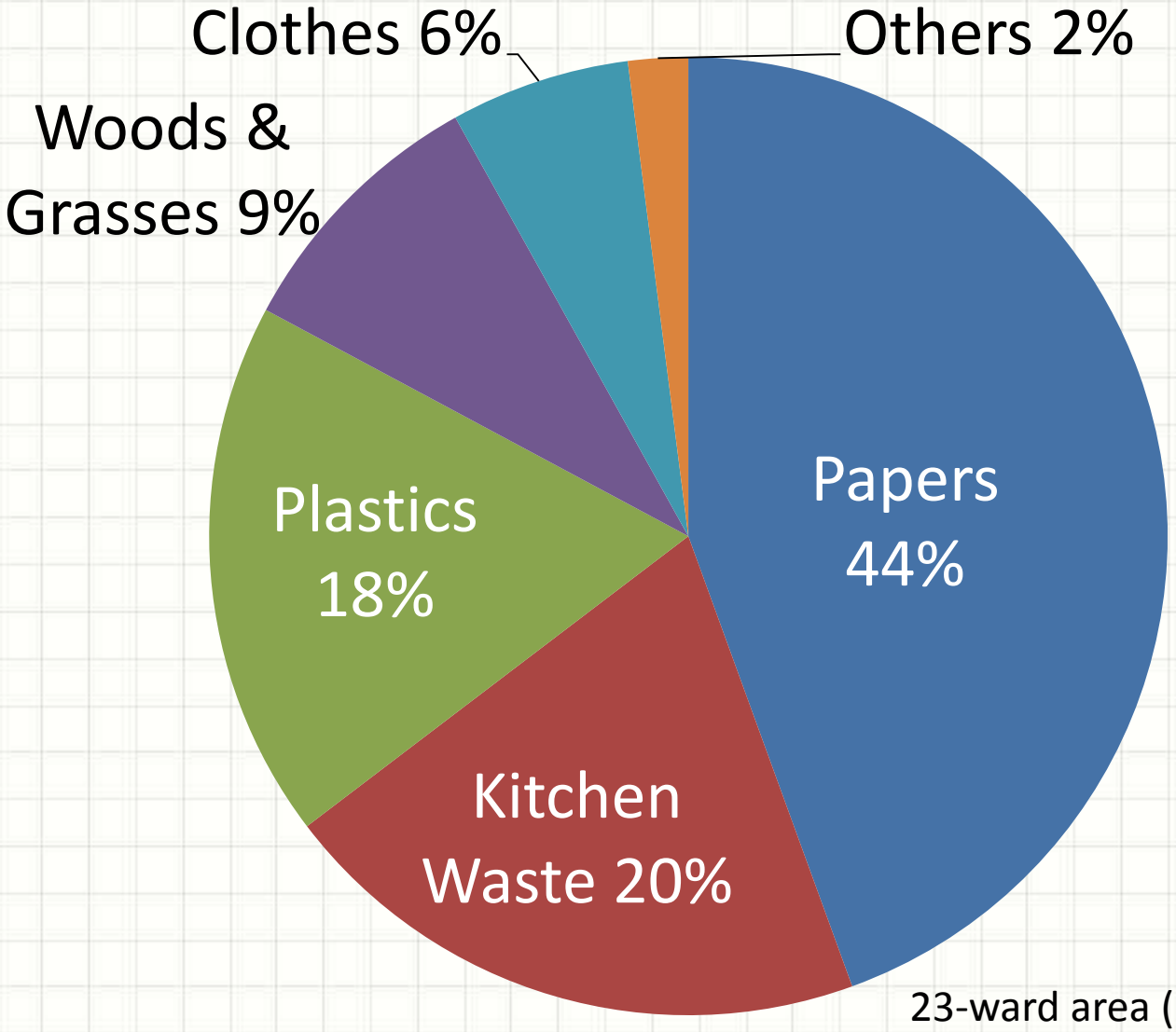
Final Disposal

RATIO OF MSW



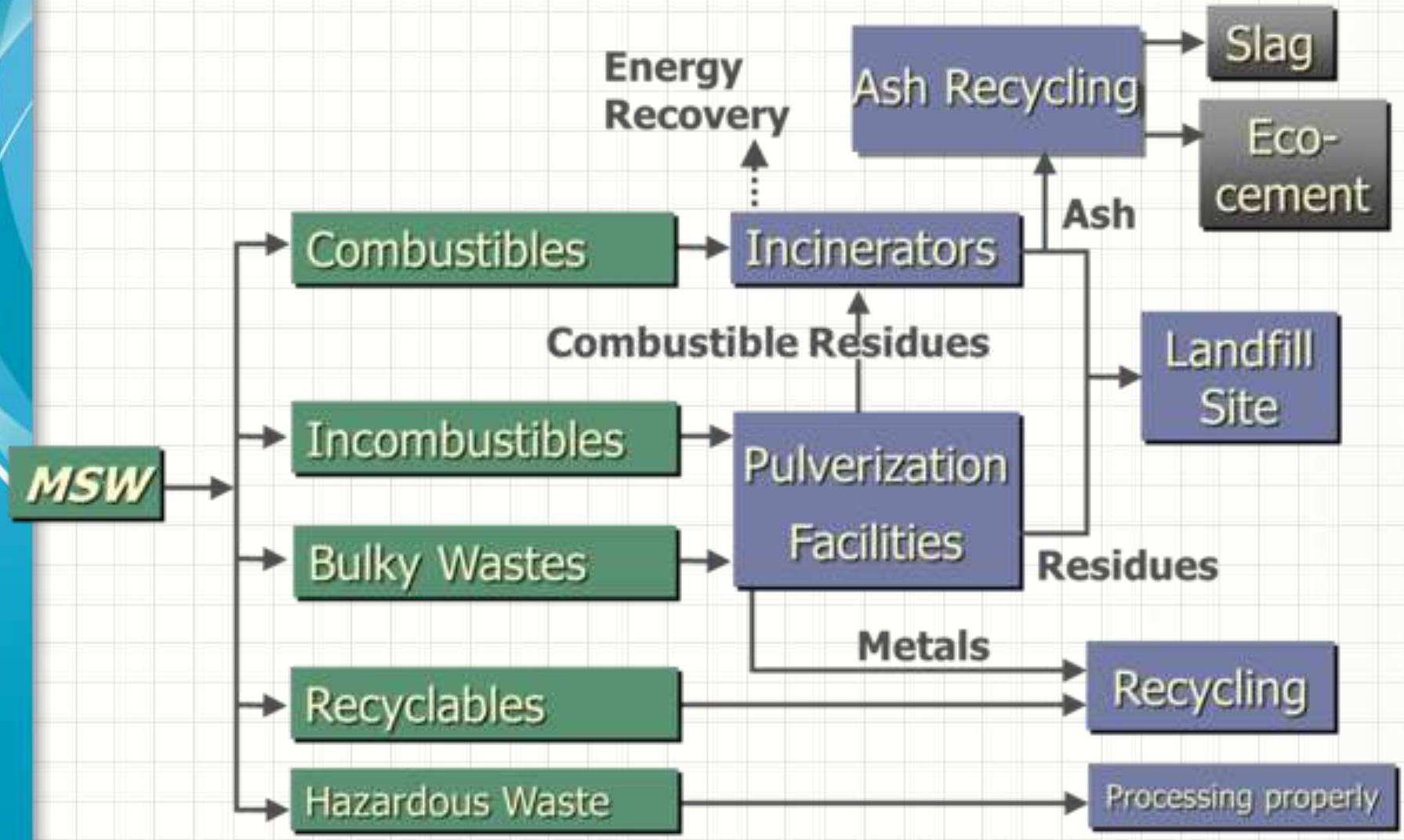
23-ward area (2013)
Source: Bureau of Environment, Tokyo Metropolitan Government

COMPOSITION OF COMBUSTIBLE WASTE



23-ward area (2013)
Data: Clean Association Tokyo23

CURRENT MSW FLOW



Source Separation by Residents

Recyclables and garbage collection point in the community

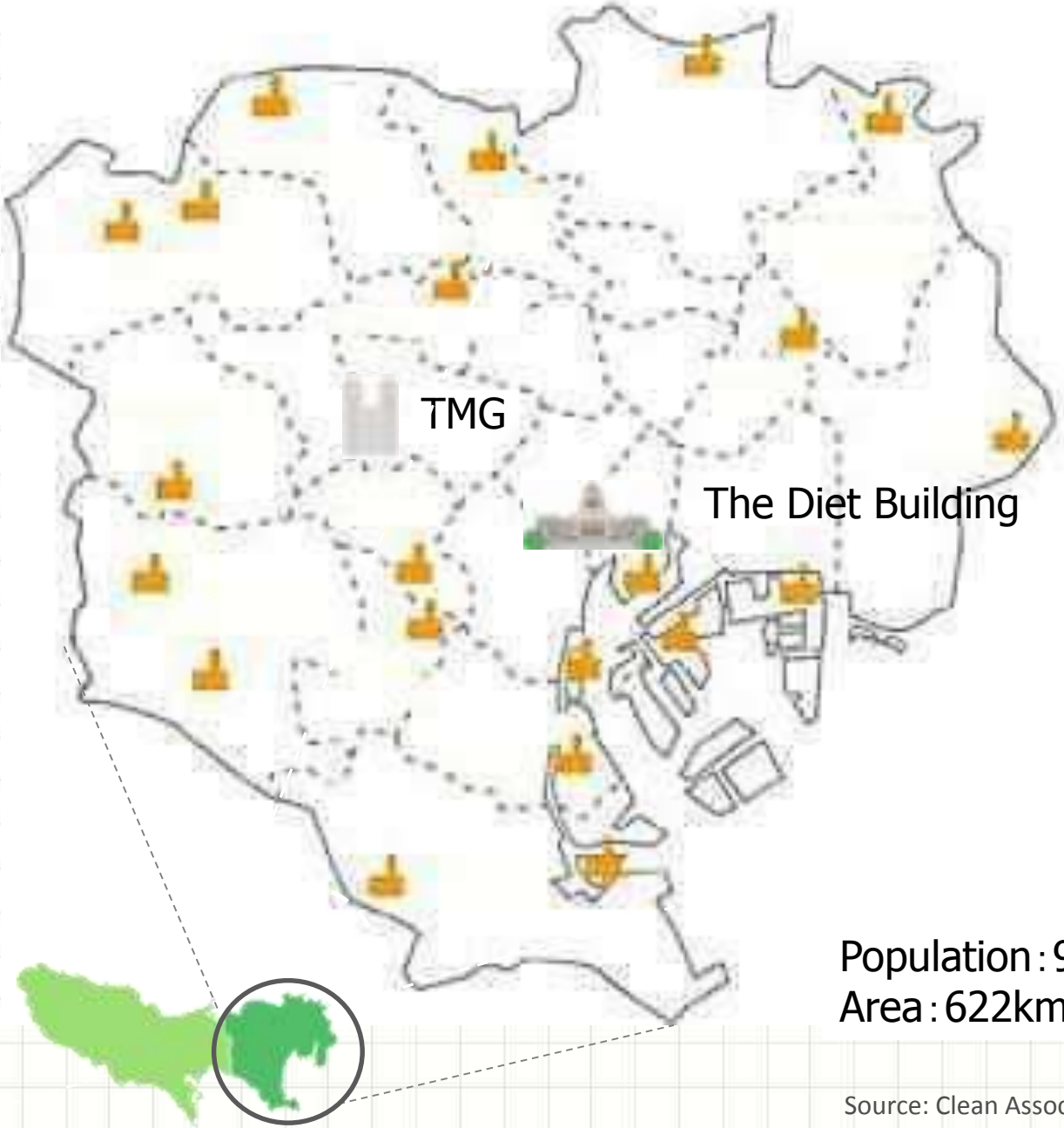
VOLUNTARY RECYCLING ACTIVITIES

Sign: Collection point for recyclables

CONTINUOUS COMMUNICATION

ENVIRONMENTAL EDUCATION

21 Incineration Plants in 23-Ward



Source: Clean Association of TOKYO23

Feature of Incineration Plant in 23 ward

Toshima incineration plant
- next to Ikebukuro Station
(2.7 million passengers/day)

All incineration plants in 23-ward (2013)
- equipped with power generator

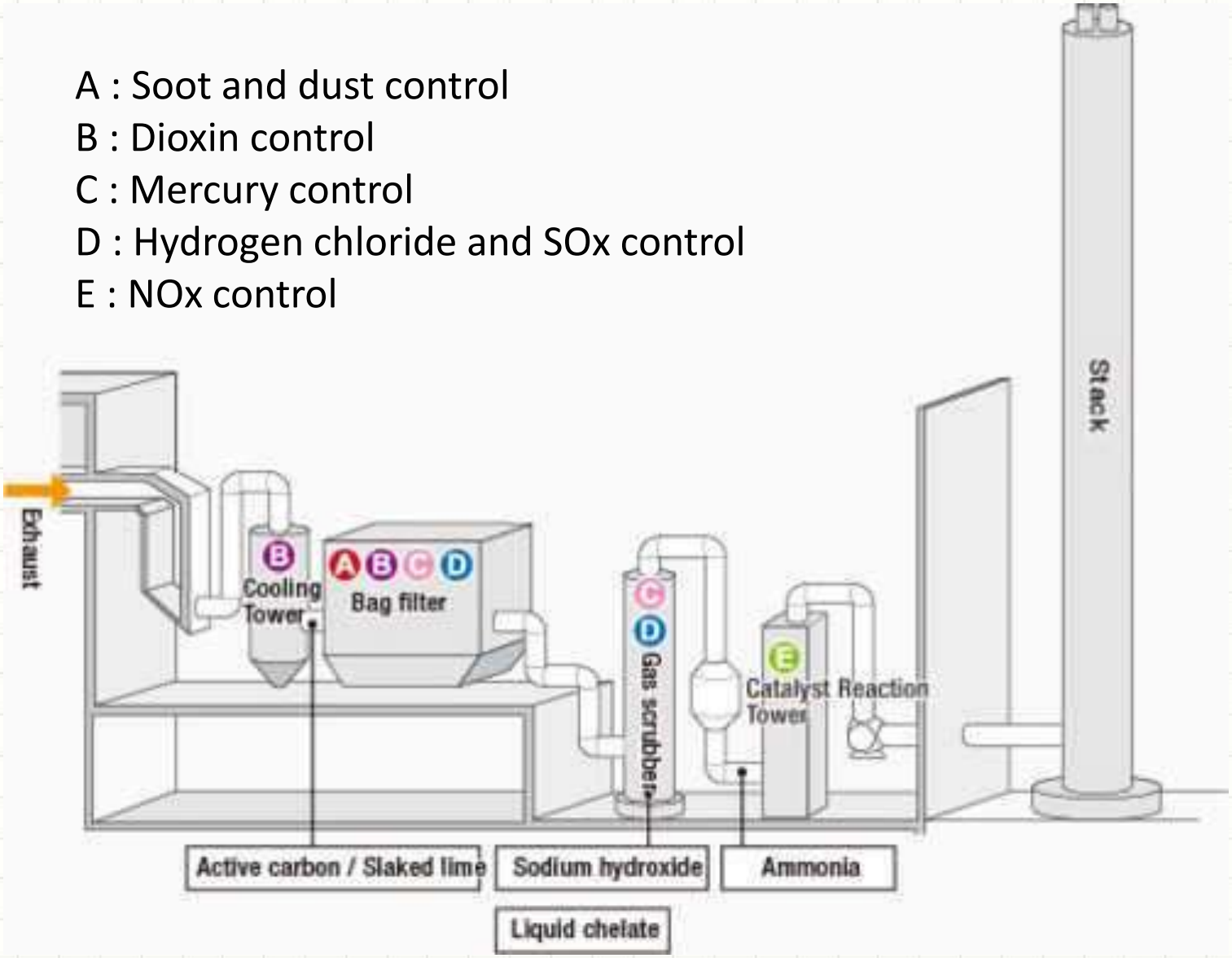
Total Generated Power	1,130million kWh
Electricity sold	572 million kWh
Income from electricity sold	9.8 billion yen
Supplied heat(Charged)	547,000 GJ
Income from heat sold	183 million yen

- have certificate of ISO14001

Source: Clean Association of TOKYO23

POLLUTION CONTROL OF SYNGAS

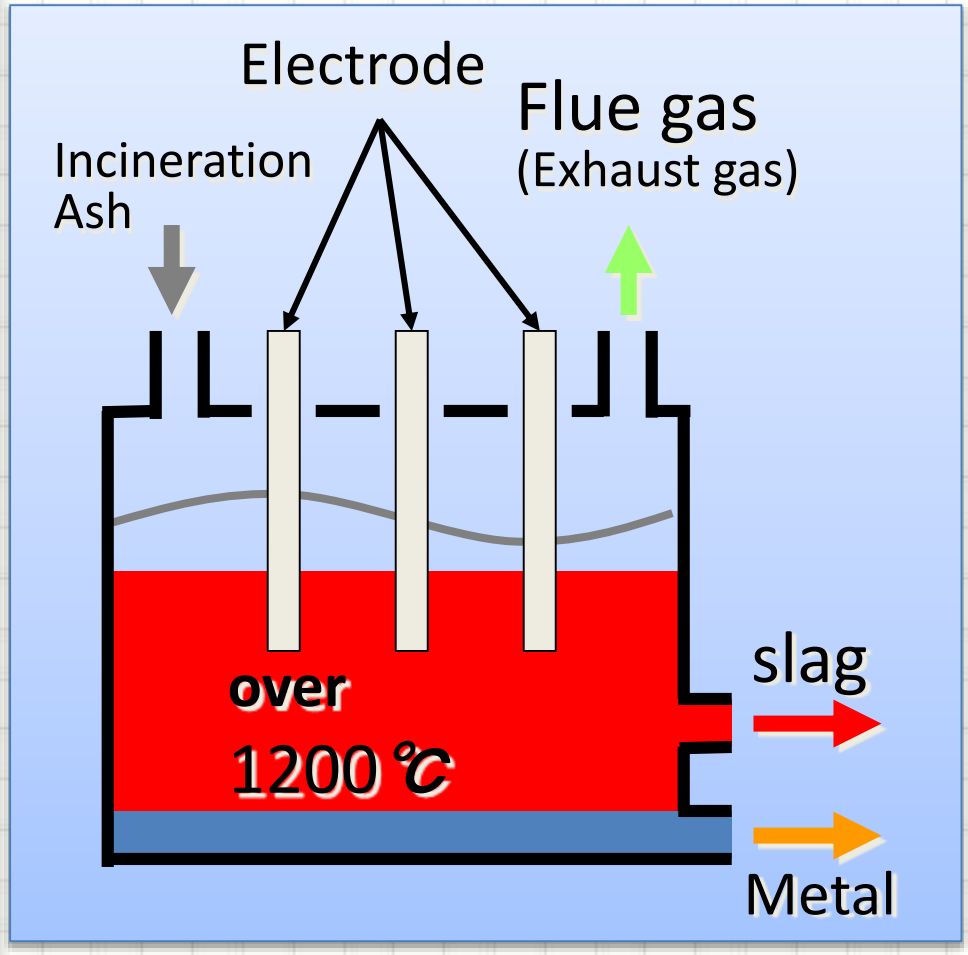
A : Soot and dust control
B : Dioxin control
C : Mercury control
D : Hydrogen chloride and SOx control
E : NOx control



Source: Clean Association of TOKYO23

ASH RECYCLING - ASH MELTING

(23 wards Area)



Ash Melting Furnace (Arc type)

Slag

Used for
construction material

Source: Clean Association of TOKYO23

ASH RECYCLING - ECO CEMENT (Tama Area)

Eco-cement

Used for construction material

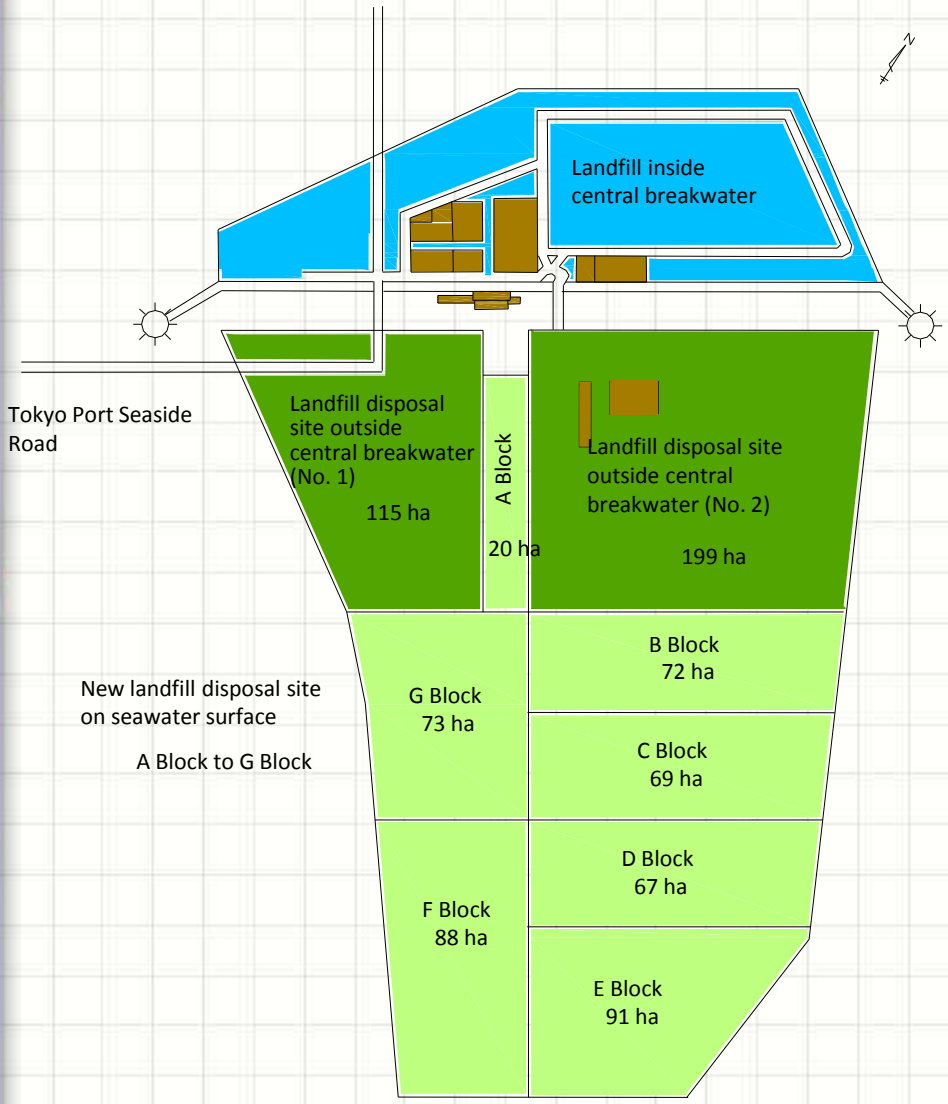
Source: Tokyo Tama Regional Association for Waste Management and Resource Recycling

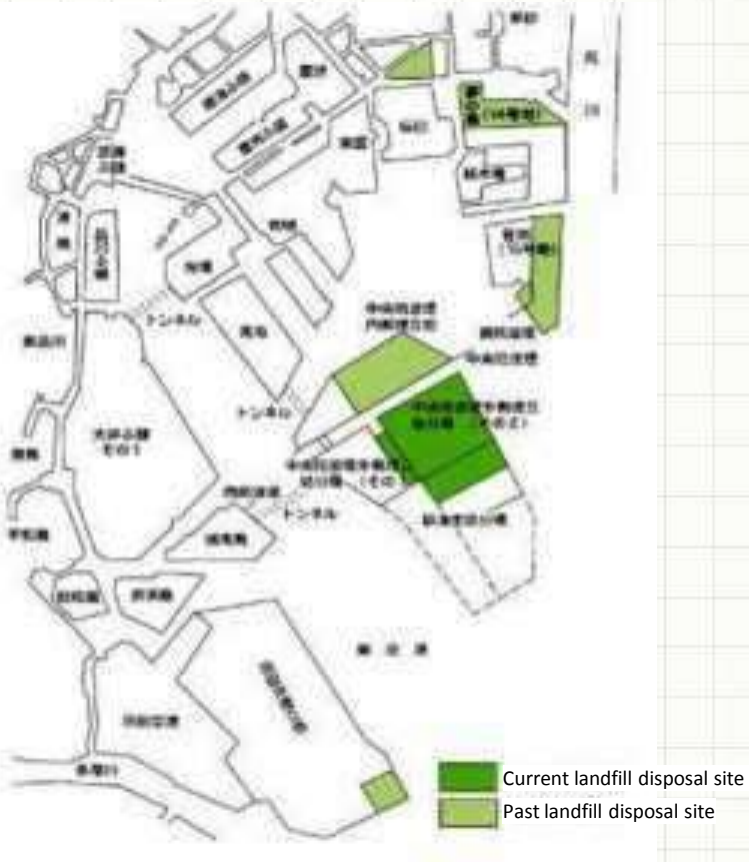
Final Disposal Site(FDS) in Tokyo Bay

Photo: Bureau of Environment, TMG

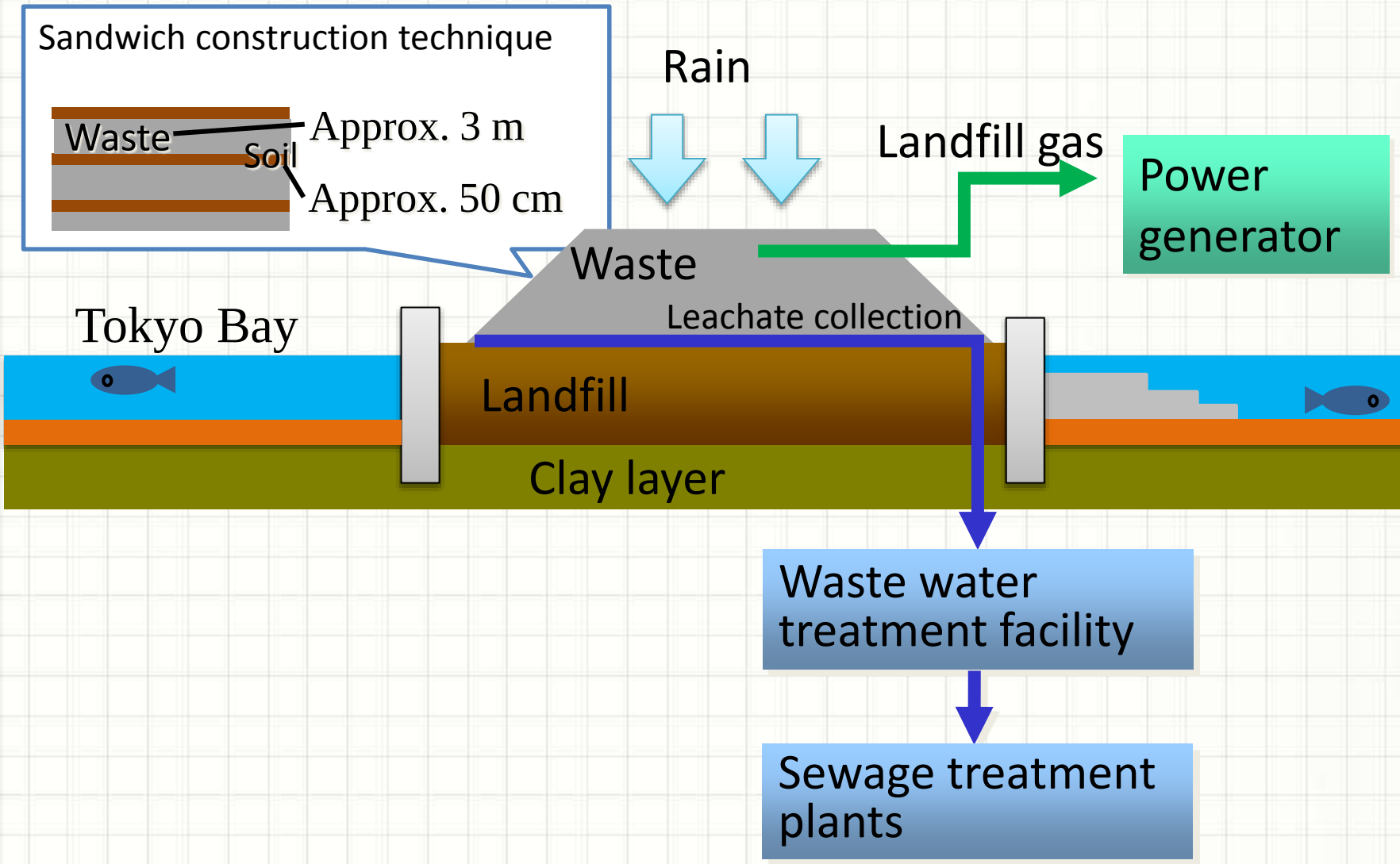
FDS

CENTRAL BREAKWATER OUTER LANDFILL SITE / NEW SEA SURFACE DISPOSAL SITE





STRUCTURE OF FDS



ENVIRONMENTAL EDUCATION AT FDS

45,000 visitors /year
(40,000 Elementary/Junior High School students included) (as of 2014)

2. 3Rs & Waste Management in Tokyo

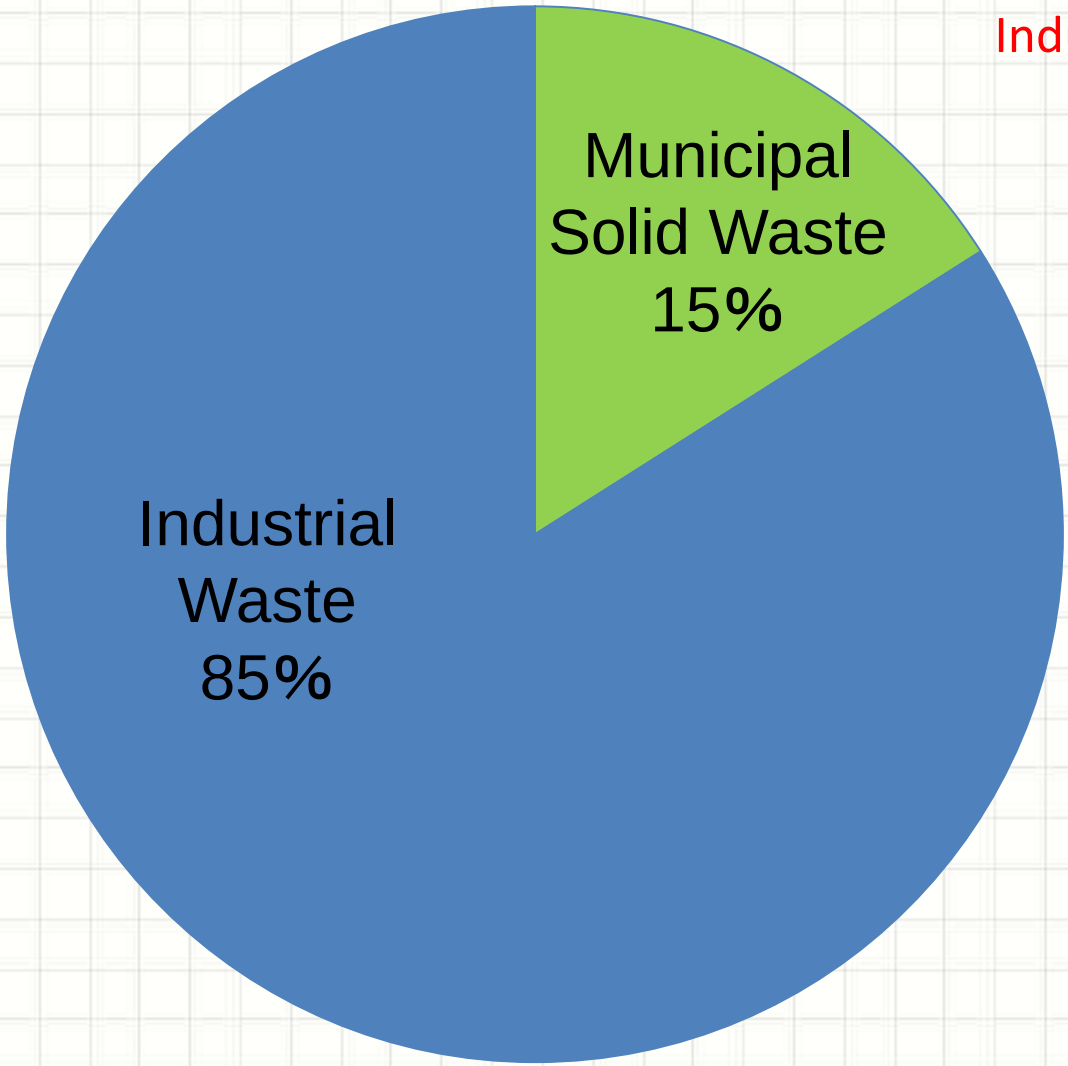
2-2 Industrial Waste

Waste Generation in Tokyo

79,100 t/day

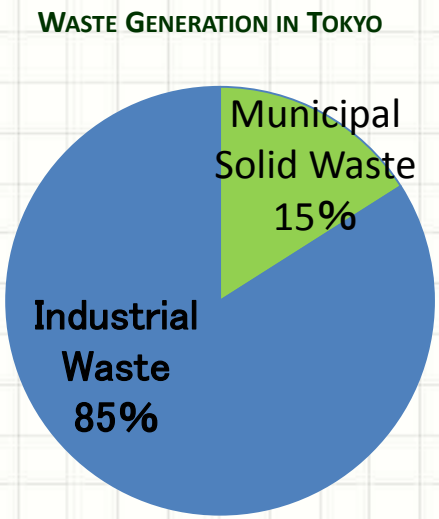
M S W : 11,700t/d

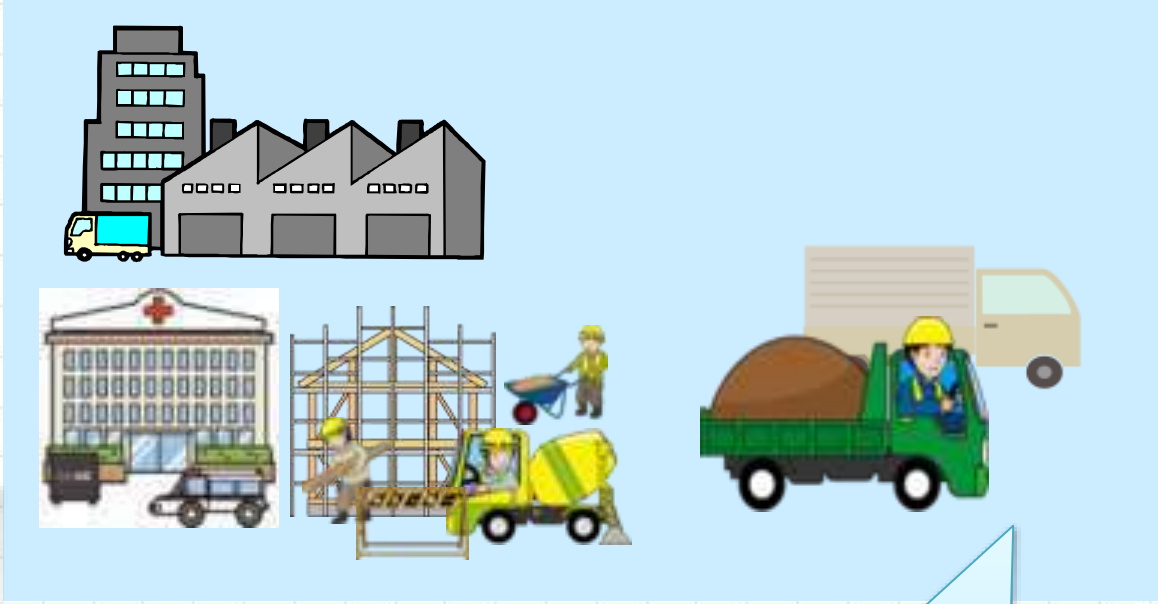
Industrial : 67,400t/d



In 2013

Industrial Waste in Tokyo 67,400t/d

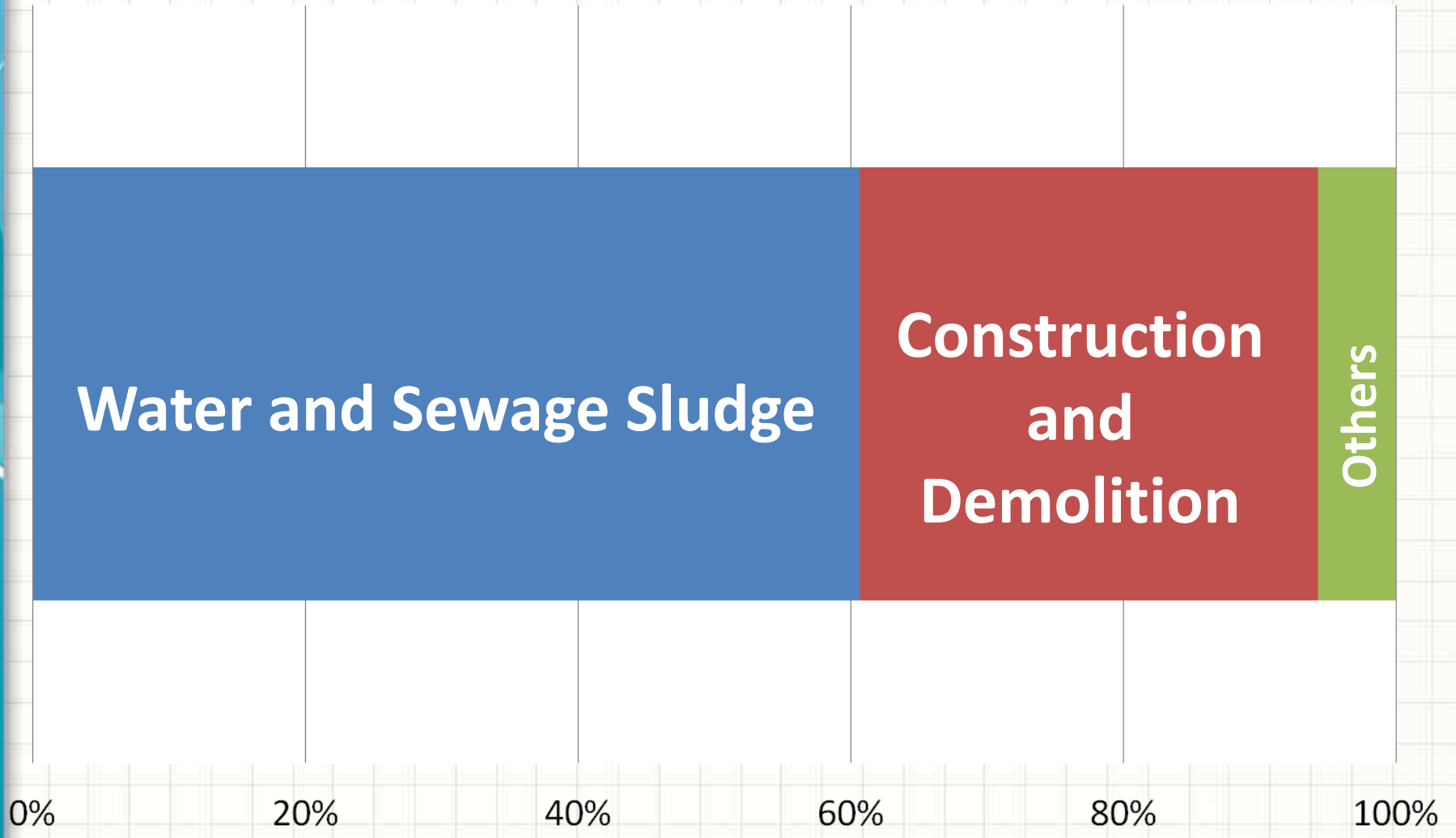




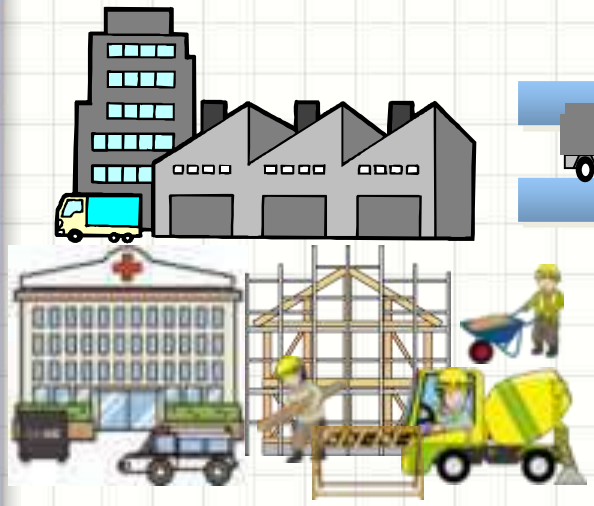
Generator has responsibility
for proper disposal

Disposed by private sector
licensed by Prefectural Government

Composition of Industrial Waste



Disposal Flow of Industrial Waste



Waste Generation
25 million tons / year

Intermediate Treatment
25 million t/y
(99.7%)

- Dehydration,
- Shredding,
- Incineration, etc.

Final Disposal
747 t/y
(3%)

Recycling
8,694 t/y
(35%)

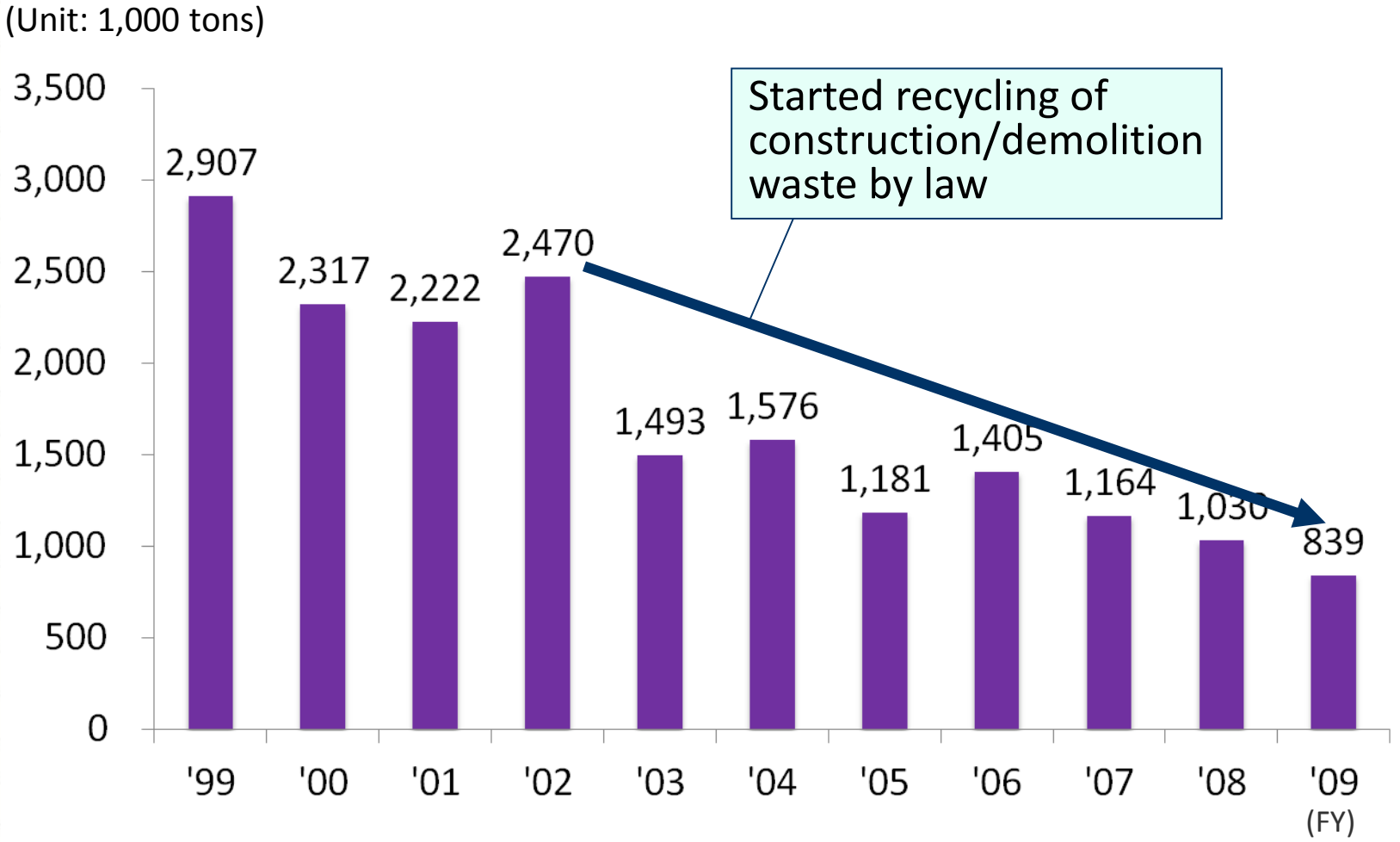
(in 2013)

- Construction businesses,
- Manufacturing businesses,
- Hospitals, etc.

- Licensed Private Company

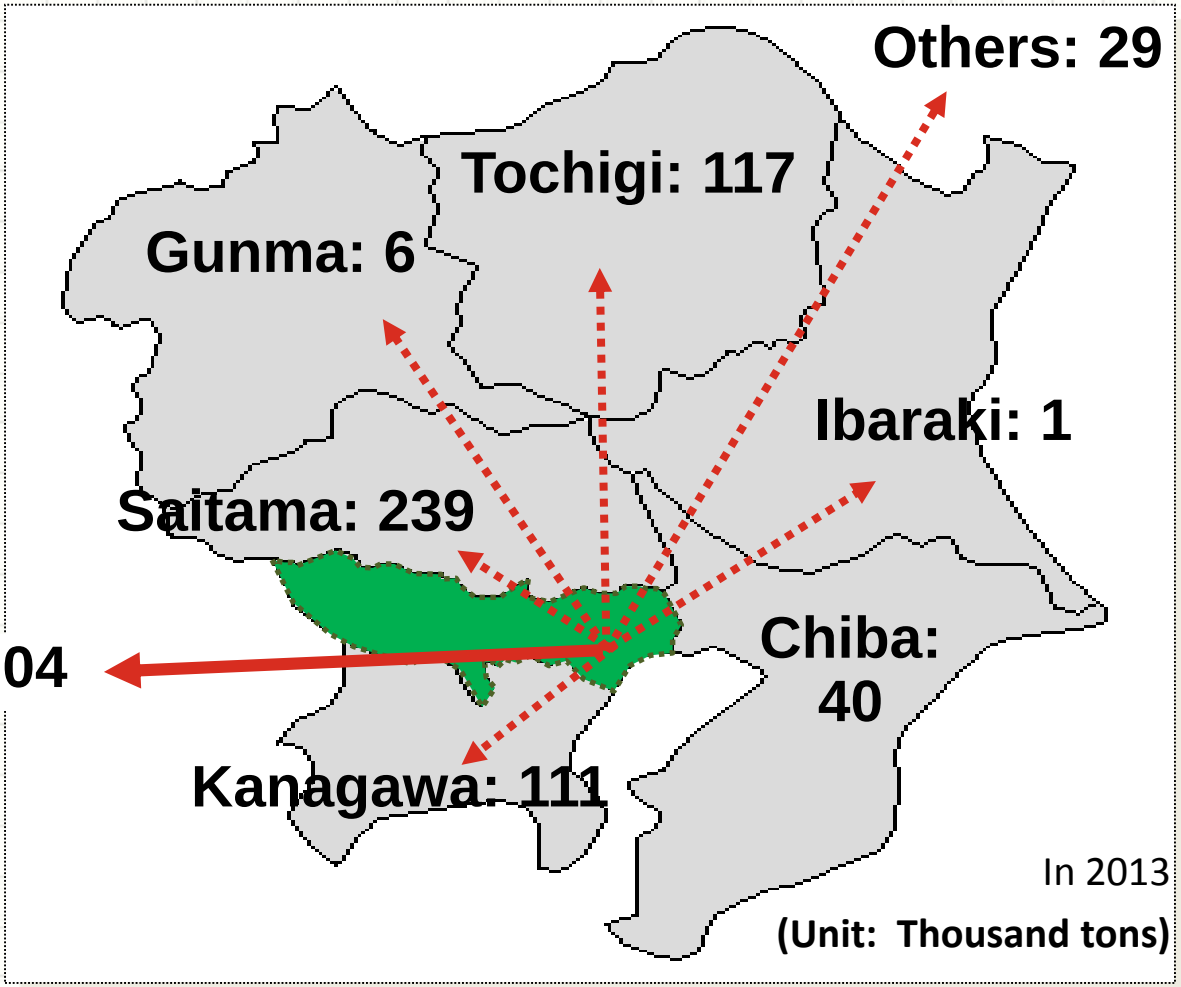
(Issued by Prefectural Government)

Reduction of Final Disposal of Industrial Waste



<CHALLENGE 1>

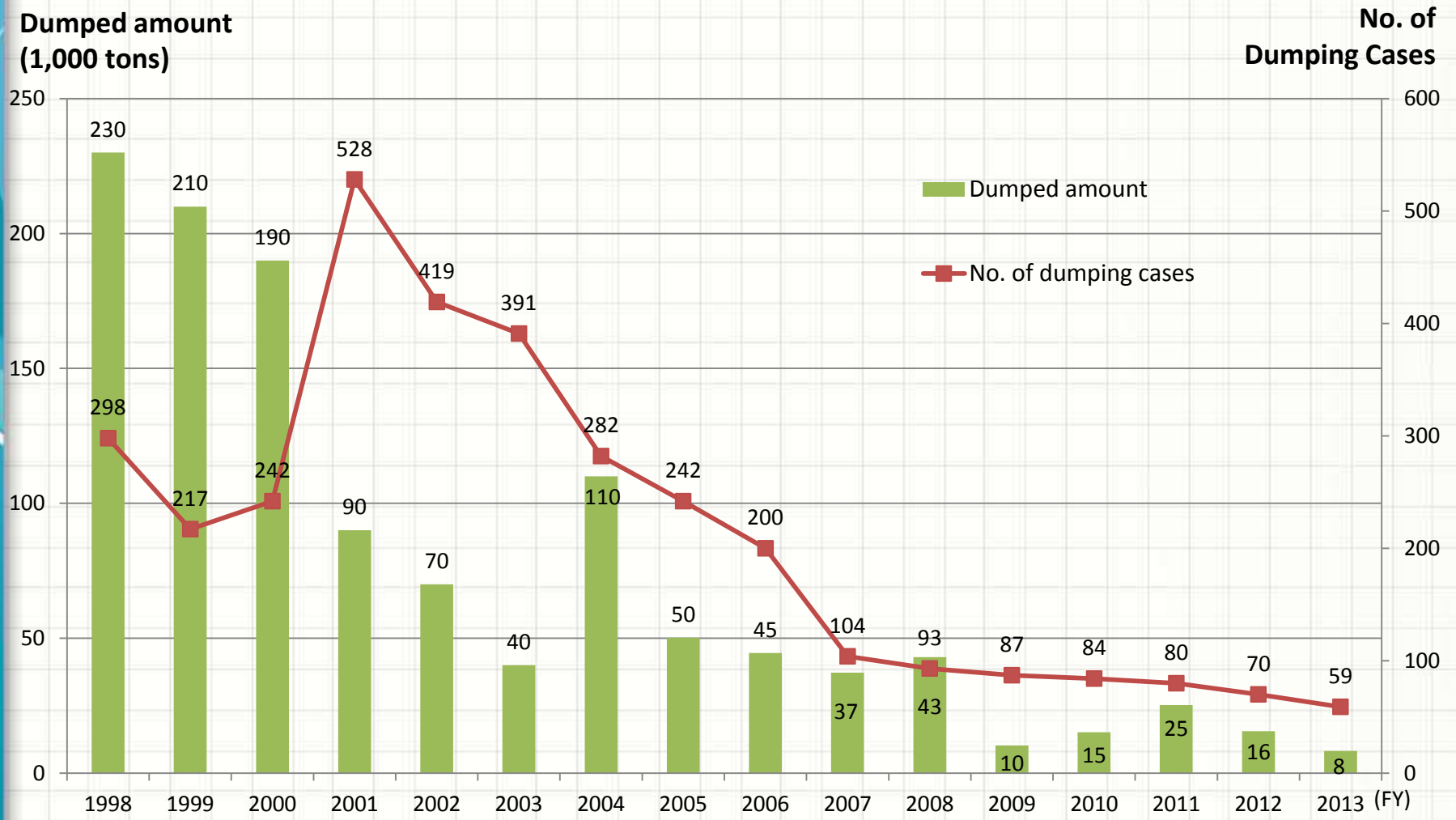
LACK OF DISPOSAL FACILITIES IN TOKYO



How wide the Industrial Waste produced in Tokyo is disposed.

<CHALLENGE 2>

ILLEGAL DUMPING IS STILL REMAINED



<CHALLENGE 2>

ILLEGAL DUMPING/DEPOSITION/EXPORTING

Aerial photo of illegal dumping site in Aomori/Iwate border

Illegal deposition of dismantled waste in Chiba

Huge illegal dumping on prefectural border of Aomori and Iwate (820 thousand m^3)

Treatment residue of end-of-life electronic appliances imported from developed countries (Guangdong, China)

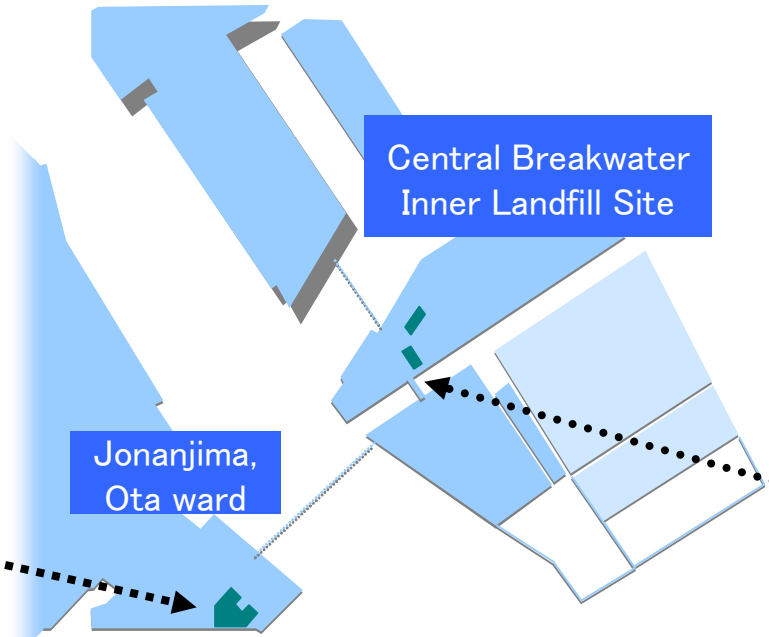
<SOLUTION 1> TOKYO SUPER ECO-TOWN

Construction and Demolition Waste

Construction and Demolition Waste Recycling Plant

Construction and Demolition Waste Recycling Plant

Construction and Demolition Waste Recycling Plant



PCB Waste Treatment

Waste Fuel Electric Power Generation Plant

Waste to Energy

E-Waste

E-Waste Recycling Plant

E-Waste Recycling Plant

Food Waste

Animal Feed from Food Waste

Biogas Power Generation from Food Waste

<SOLUTION 2> INSPECTION AT TOLLGATE

29 Local Government work together for eliminating illegal dumping.

<SOLUTION 3>
CERTIFICATION SYSTEM OF TOP-RUNNER INDUSTRIAL WASTE DISPOSAL COMPANY

Outline

Third party organization designated by TMG certify “Expert” and “Professional” companies which conduct proper disposal, recycling and reduction of environmental impact from their activities.

Purpose

1. Disseminate information about reliable disposal company to waste generator
2. Cultivate good company , promote proper disposal
3. Develop waste disposal & recycling industry

Evaluation item

1. Compliance
2. Stability
3. Advanced activities

Expert

Professional

The certificate and a special sticker are given to certified companies.

2. 3Rs & Waste Management in Tokyo

2-3 TMG's 5-year Plan

Composition of Current Plan

Planning Period

FY 2011 to 2015

Structure

- Body
  - 1 Planning Targets
  - 2 Primary Measures
    - (1) Promotion of 3R's
    - (2) Promotion of proper treatment
    - (3) Promotion of developing reverse logistics businesses

Planning Targets

Planning Targets

1.25 million tons for amount of final disposal in FY 2015

(30% reduction comparing FY 2007)

Breakdown: Municipal solid waste 250K tons (down 60%)

Industrial waste 1 million tons (down 14%)

Planning Targets

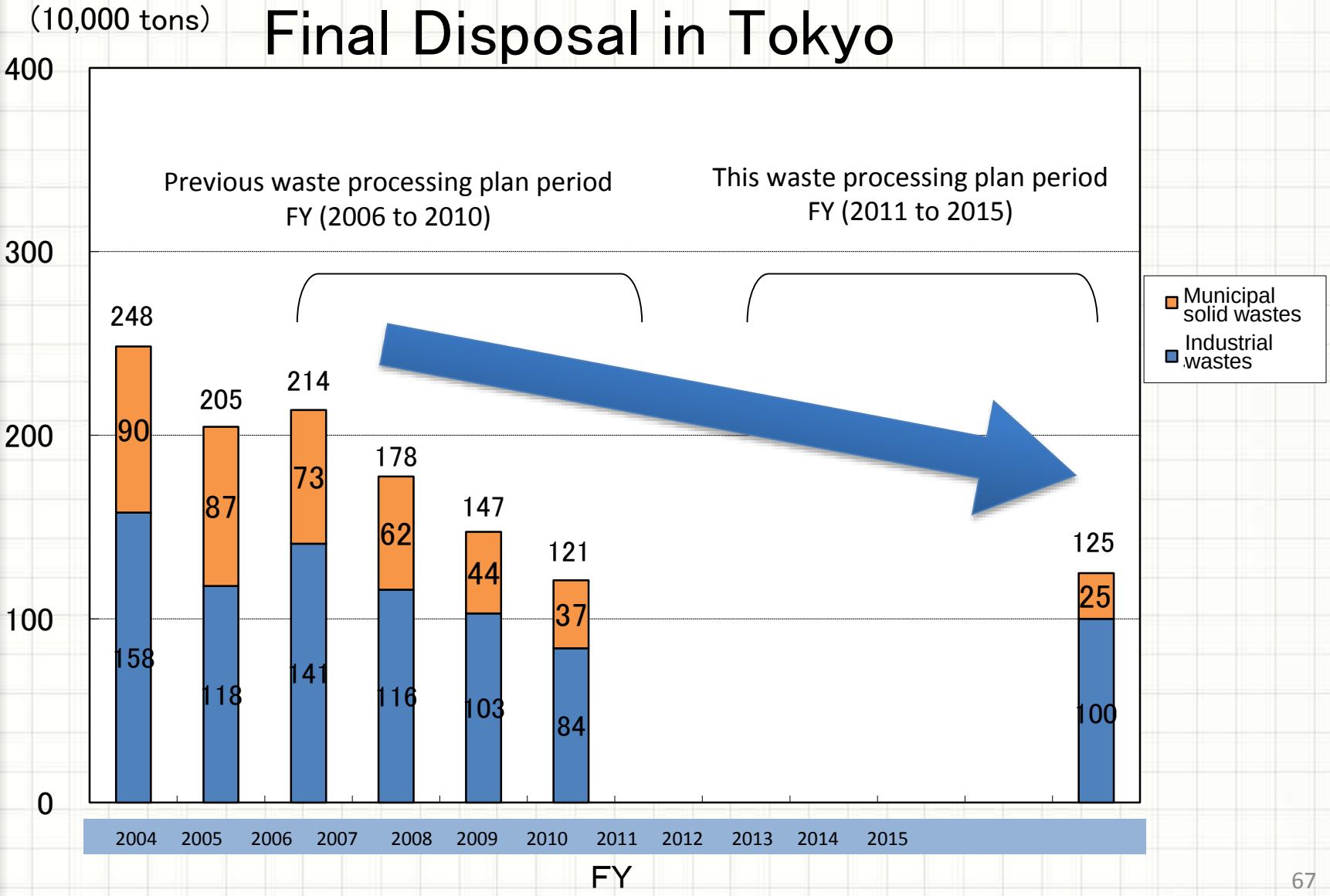
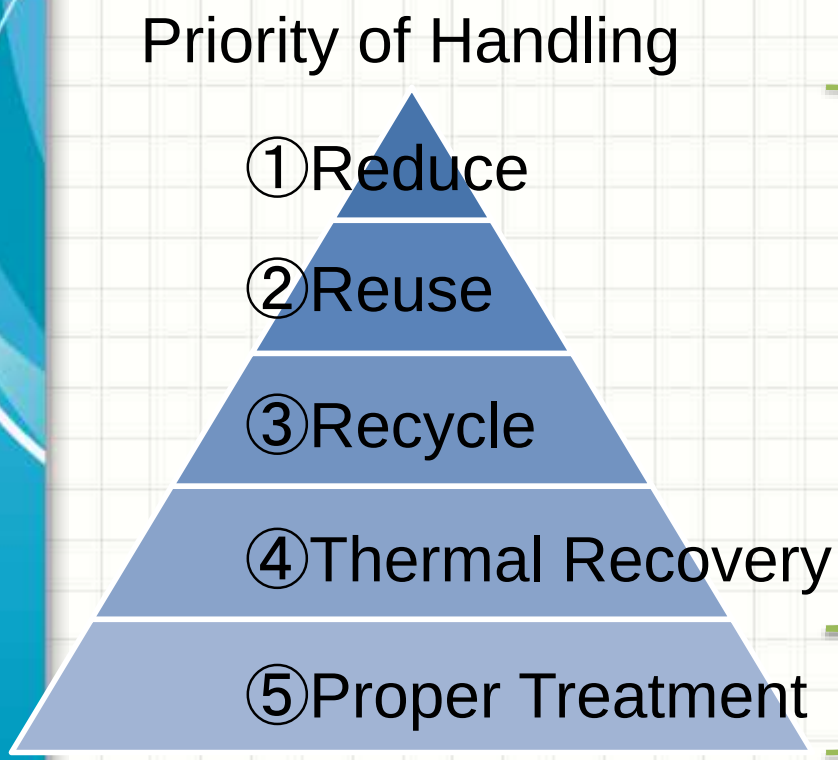


Image of Policy Structure



a) Promotion of 3R's

b) Promotion of proper treatment

c) Promotion of developing reverse logistics businesses

Primary Measurement (1) Promotion of 3R Measures

- **Promotion of reuse to suppress generation**

  Change to paying for household garbage and entrench being a society that doesn't generate waste

- **Promote recycling**

  Develop urban mining, make reverse logistics and heat recovery more efficient, and utilize methane gas from landfill sites

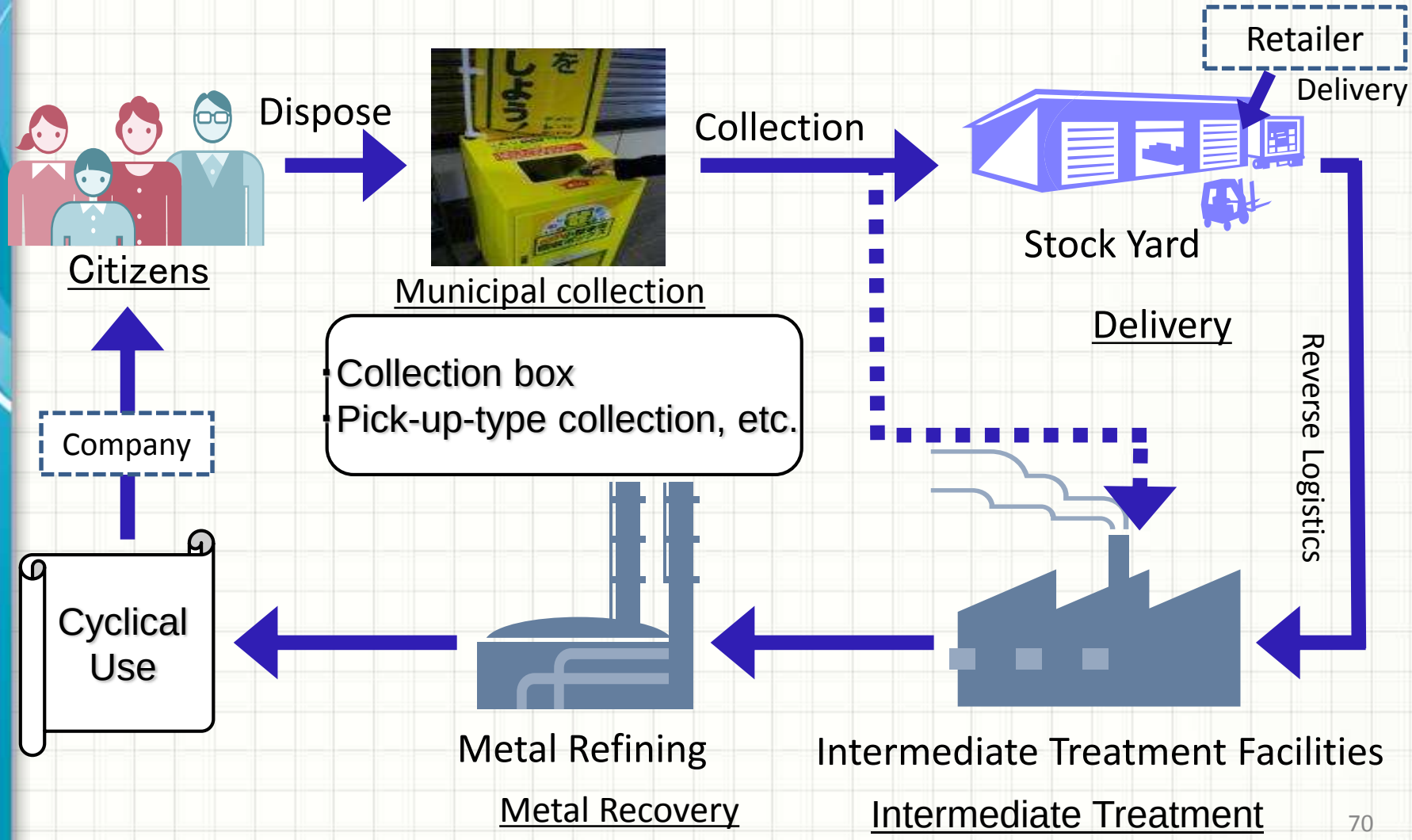
- **Visualization of 3R effects**

  Visualization of amount of resources invested and the effect of reducing greenhouse gases from cyclical use of resources, and make the costs involved in recycling transparent

- **Create a system that supports 3R**

  Promote public awareness of green purchasing and promote environmental education and public awareness

Development of Urban Mining (Recycling, such as small appliances)

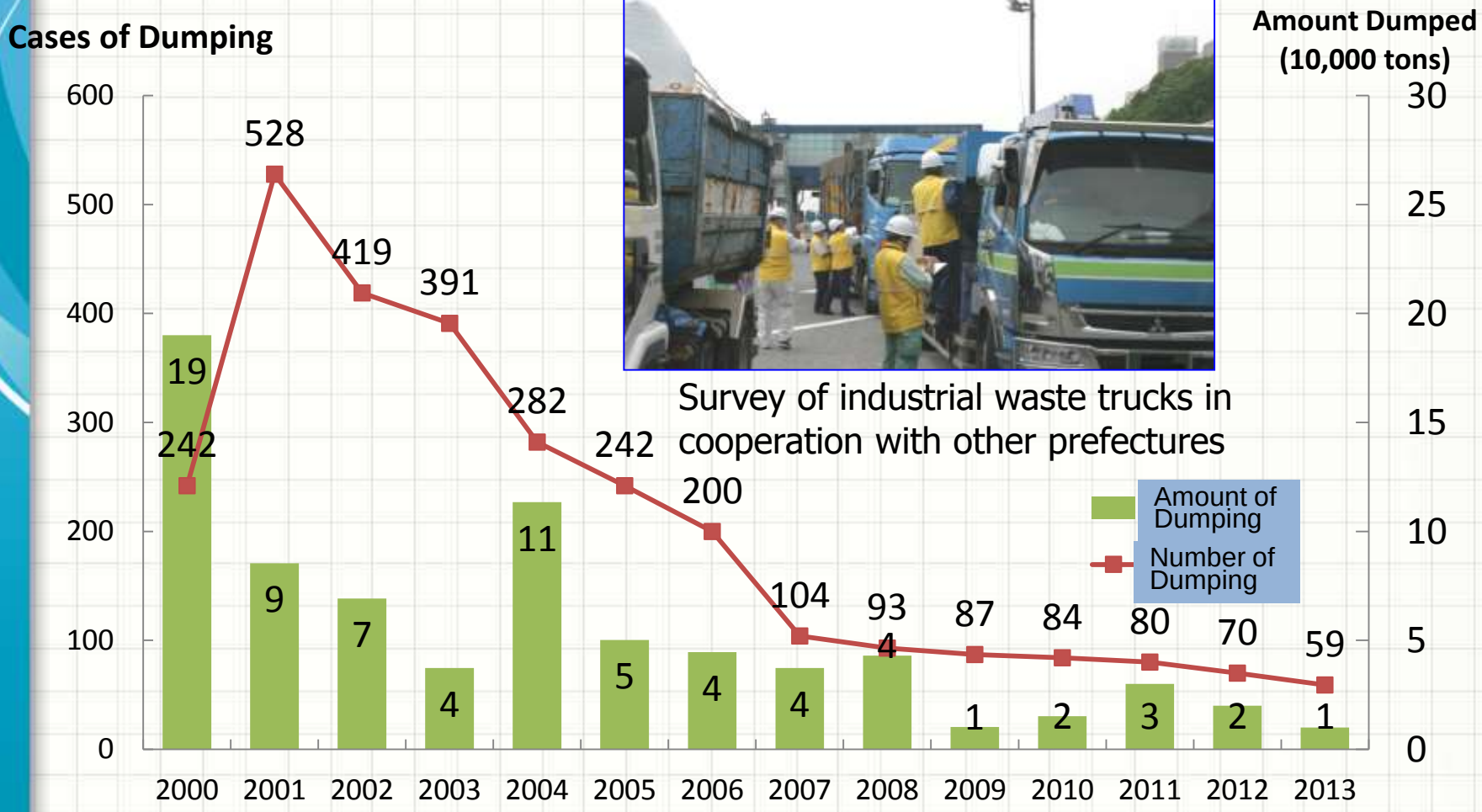


Primary Measurement (2) Promotion of Proper Treatment

- **Toxic waste**
  Develop system for properly treating waste with minute amounts of PCBs, continue accepting friable asbestos, reduce and properly treat amount of mercury used
- **Industrial waste**
  Thoroughly separate and properly dispose of non-friable asbestos and waste gypsum board, strengthen leadership in order to eliminate illegal dumping, such as by using industrial waste G-men
- **Municipal solid waste**
  Promote proper disposal of hazardous materials, such as aerosol cans, lighters, etc., and home medical care waste
- **Waste treatment facilities**
  Reduce the environmental load and maintenance costs of landfill sites and give guidance and advice to local government recycling facilities

Strengthening Guidance for Eliminating Illegal Dumping

Survey of industrial waste trucks in cooperation with other prefectures



Primary Measurement (3) Promoting Development of Reverse Logistics Businesses

- **Create an environment where good waste processors dominate**

  Work to understand the burden of costs of proper disposal on producers of waste, and the structure and actual situation of the industry; develop specialist processors and recyclers

- **Super Eco-Town businesses**

  Actively disseminate information at home and abroad on the successes of Super Eco-Town businesses as examples of progressive initiatives

- **Joint technical research**

  Conduct joint technical research and surveys via industry/academic cooperation with the aim of higher levels of waste treatment and recycling technologies

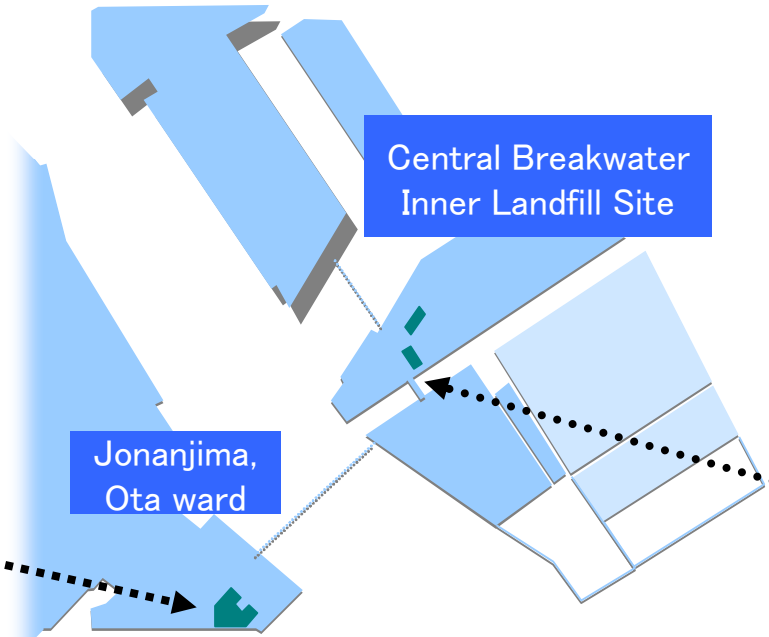
Super Eco-Town Businesses

Construction and Demolition Waste

Construction and Demolition Waste Recycling Plant

Construction and Demolition Waste Recycling Plant

Construction and Demolition Waste Recycling Plant



PCB Waste Treatment

Waste Fuel Electric Power Generation Plant

Waste to Energy

E-Waste

E-Waste Recycling Plant

E-Waste Recycling Plant

Food Waste

Animal Feed from Food Waste

Biogas Power Generation from Food Waste

THE ROLE OF TMG AND PRIVATE COMPANY

- **Tokyo Metropolitan Government**
  - Sell the TMG-owned land to the private company
  - Public offering of waste management company
  - Technical advice related to the environmental measures
  - Enlightenment including observation tour of facilities

- **Private company**
  - Purchase of the TMG-owned land
  - Construction and operation of facility
  - Disclosure of facility and diffusion of technology
  - Management of the Tokyo Super Eco Town council

Construction and Demolition Waste Recycling

Takatoshi Corporation Ltd.

Industrial wastes (construction and demolition waste / business-related industrial waste)

General wastes (plastic waste /scrap wood)

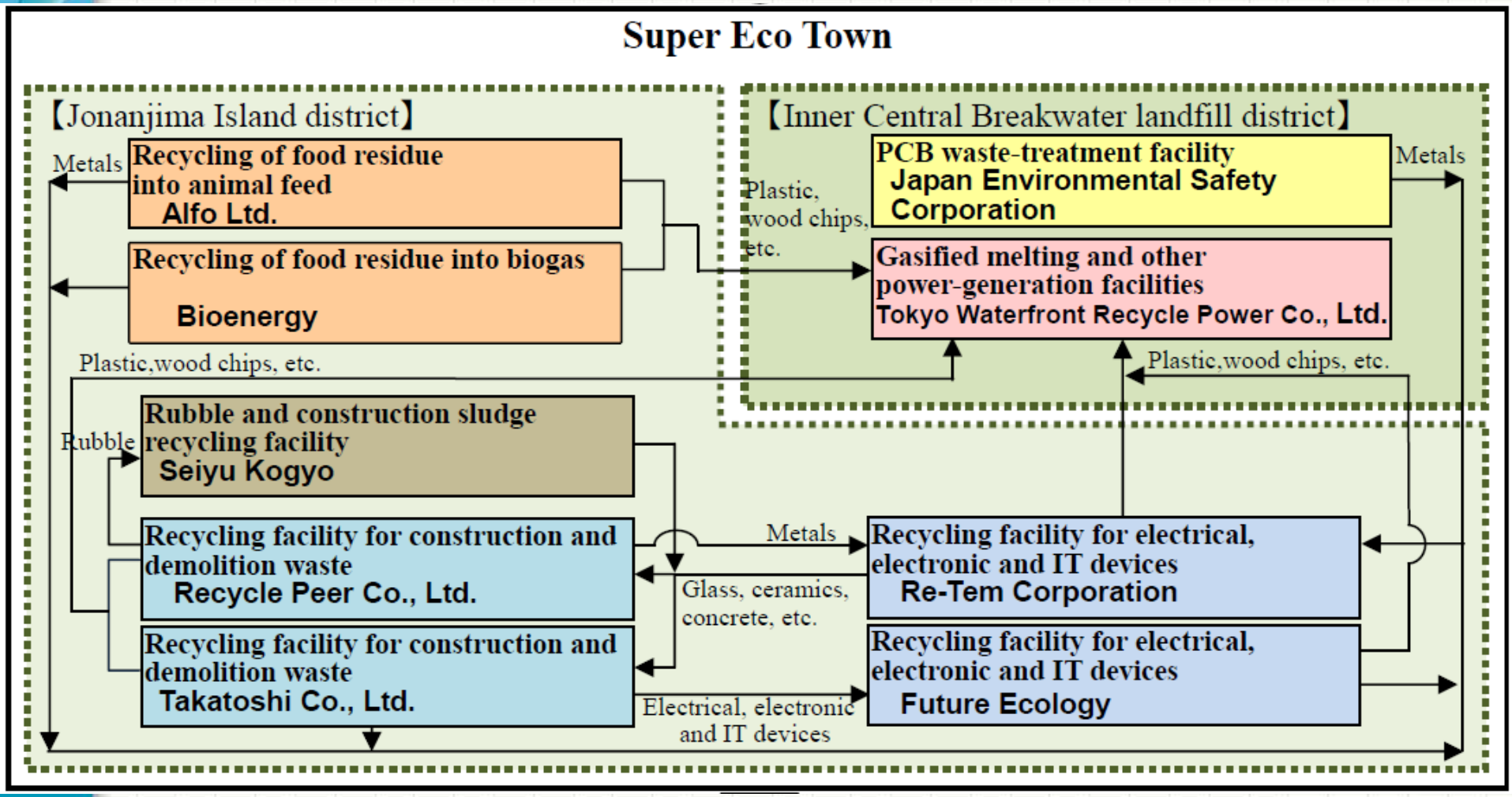
928t/day

Recycling rate of over 90%

Recycled sand
Approx. 80t/day

Other items
Approx. 783t/day

INTERCONNECTION OF EACH FACILITY —ACTIVITY FOR ZERO LANDFILLING—



2. 3Rs & Waste Management in Tokyo

2-4 TOWARD 2020

– NEW WASTE MANAGEMENT PLAN –

TOWARD FORMULATING A NEW PLAN

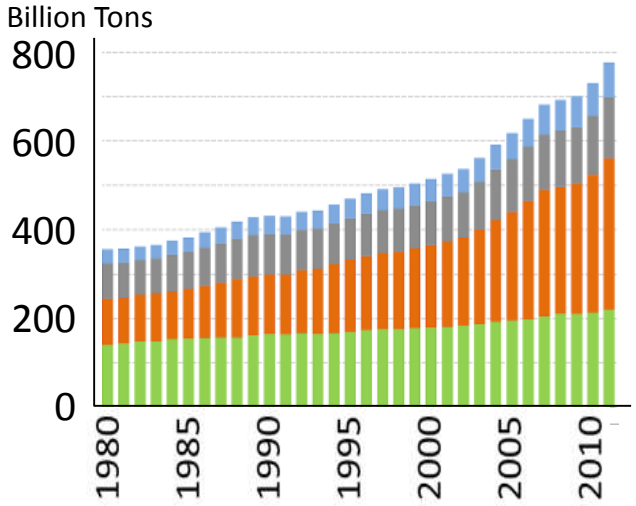
- Policies Aimed at **"Sustainable Use of Resources"** (March 2015)

  To develop a **New Waste Management Plan (Period: FY 2016-2020)**, establish policies that indicate the direction of new measures, based on today's global situations.

INCREASED CONSUMPTION OF RESOURCES AND THEIR ENVIRONMENTAL IMPACT

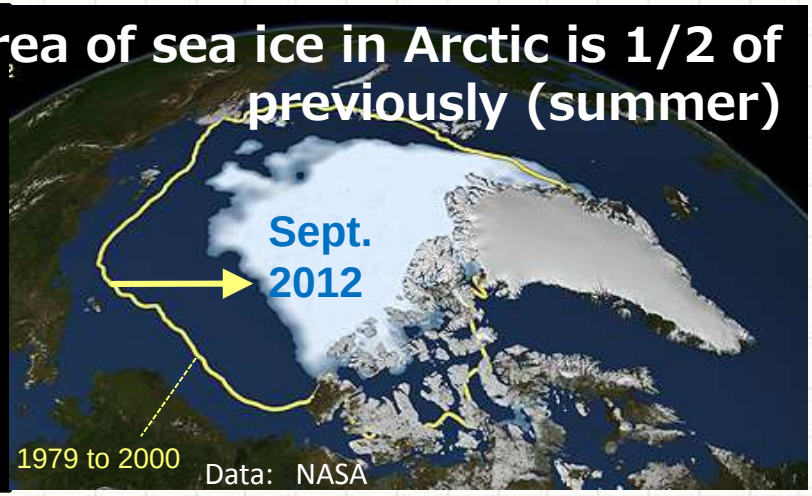
Increased Consumption of Resources Globally

Consumption of Resources Globally Doubled in 30 Years



Data: materialflows.net

Climate Change

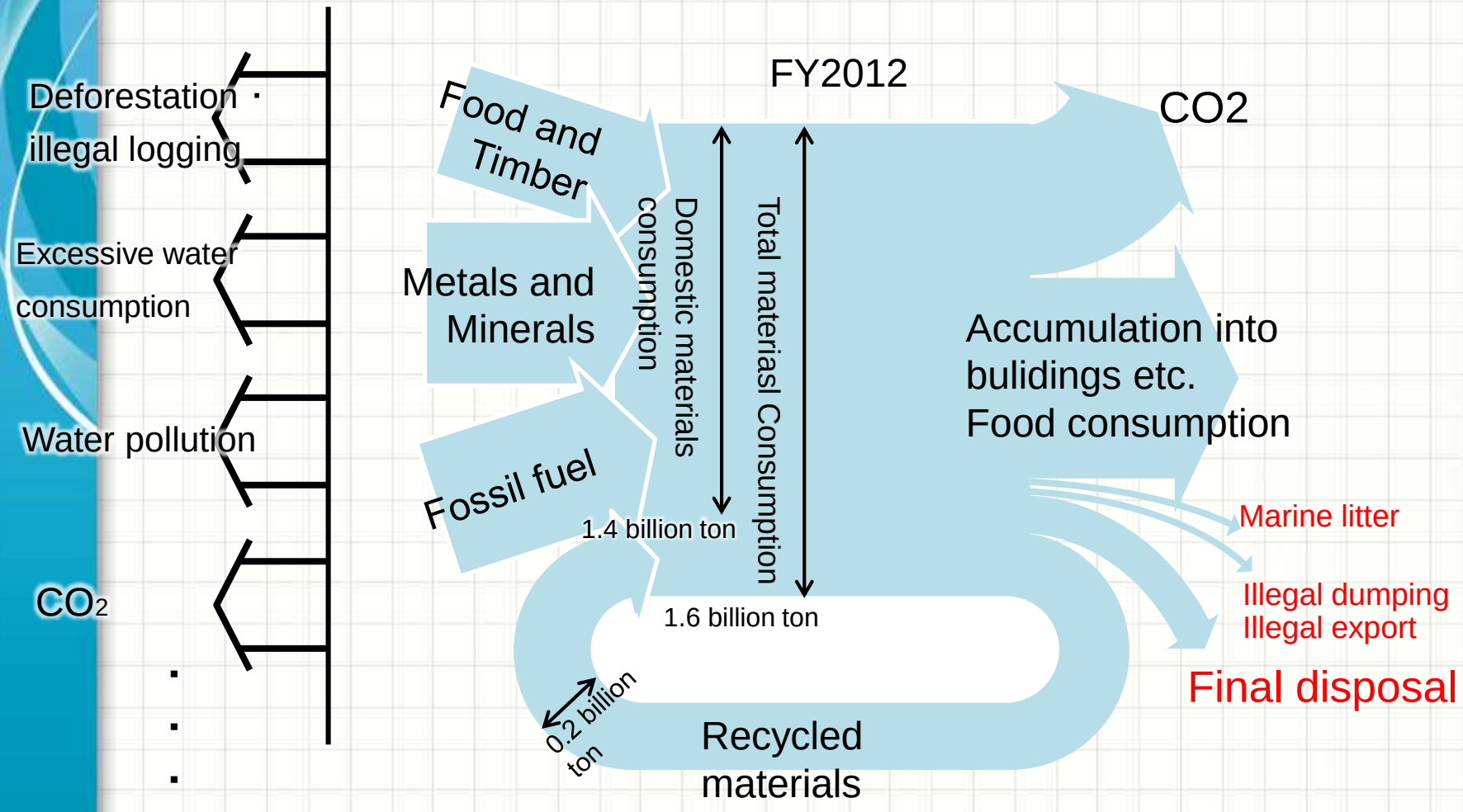


Deforestation

http://www.env.go.jp/nature/shinrin/fpp/worldforest/index1.html

Photo: Tropical Forest Action Network, Data: FAO

JAPAN'S MATERIAL FLOW AND UPSTREAM AND DOWNSTREAM IMPACTS



Source: MOEJ

Tokyo's Strategy toward Sustainable Resource Use

- ✓ From Waste Management to 'Sustainable Materials Management'
- ✓ Take the entire supply chain into considerations, including the stage of resource extraction to .

3 Pillars

- Reduce loss of resources
- Promote sustainable procurement
- Further promote recycling of waste

1ST PILLAR REDUCE LOSS OF RESOURCES

-Review waste in resource consumption and improve resource productivity-

■Reduce food losses

- 5 to 8 million tons of edible food is wasted every year in Japan.

Food Put out as Combustible Waste

2ND PILLAR PROMOTE SUSTAINABLE PROCUREMENT

--Use low-carbon, symbiotic and readily recycled materials/products-

Use Sustainable Lumber

- Much plywood forms is made of tropical woods imported from places like Malaysia & Indonesia.

Concrete Forms using Domestic Lumber

3RD PILLAR FURTHER PROMOTE RECYCLING OF WASTE

--Greater levels of recycling and prevent improper disposal-

Create Rules for Recycling Commercial Waste

Not enough commercial waste, such as plastics, generated in places like office buildings is recycled

Waste Plastic from Office Building.

ACTIVITIES FOR THE FUTURE

- From FY 2015, start **projects for sustainable resource use** collaborating with businesses and NGOs
- Work with local governments and waste management companies
  → Initiatives like creating rules for recycling commercial waste

Creating the legacy of Tokyo 2020 Olympics & Paralympics

Sutainable Consumption and Production

(Goal 12 of SDGs)

3. Conclusion

3. Conclusion

- It took a long period
- Both "soft" and "hard" are essential
- Hoping to share experiences

1929

1999

Thank you for your attention !

TOKYO METROPOLITAN GOVERNMENT 東京都