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

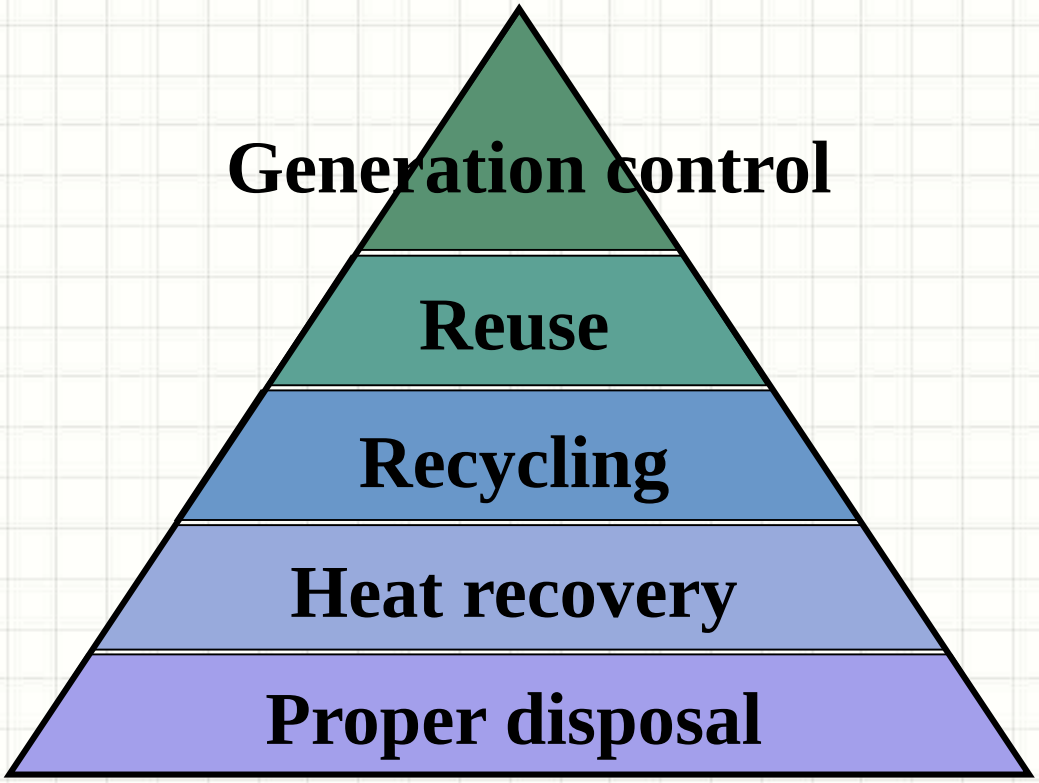
Basic Act for the Sound Material-cycle Society

- **Effective Resource Utilization Act**
- **Waste Management 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



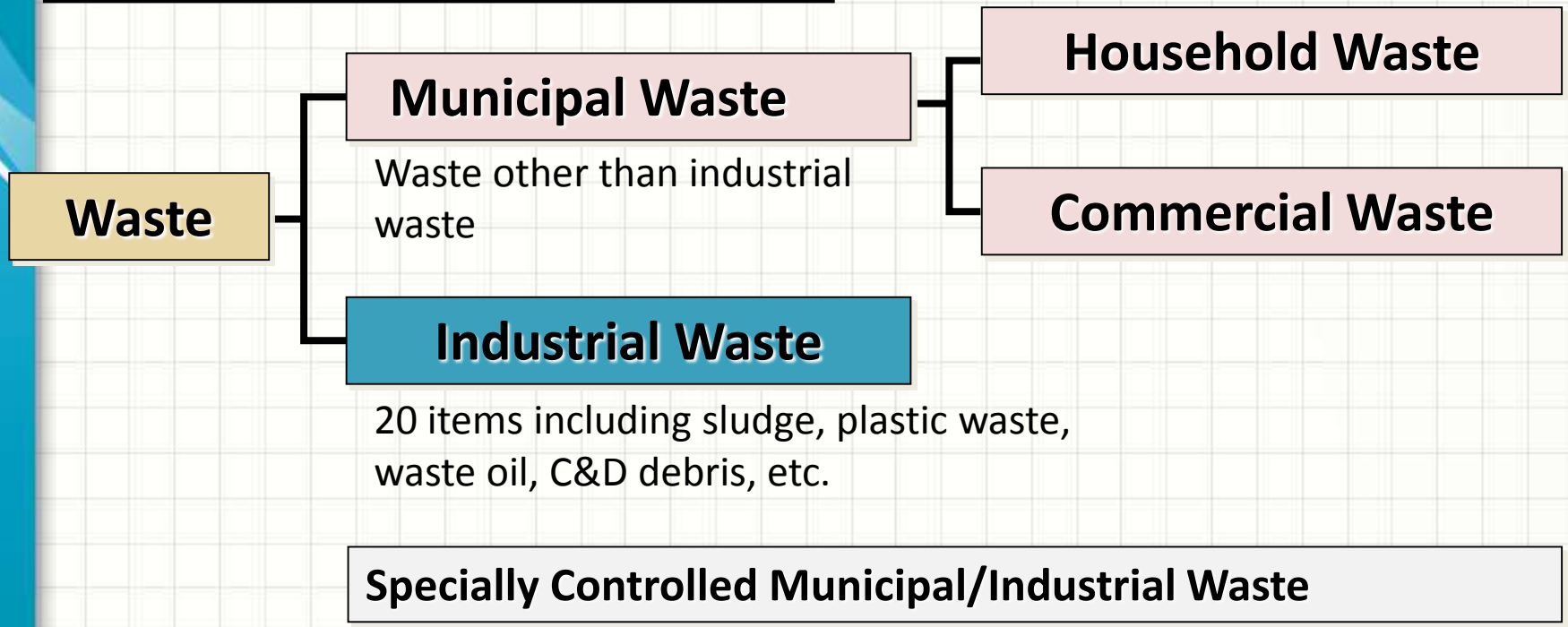
The hierarchy ranks waste management options according to their environmental benefits. These options should be taken, in this order, whenever environmentally beneficial and economically viable.

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

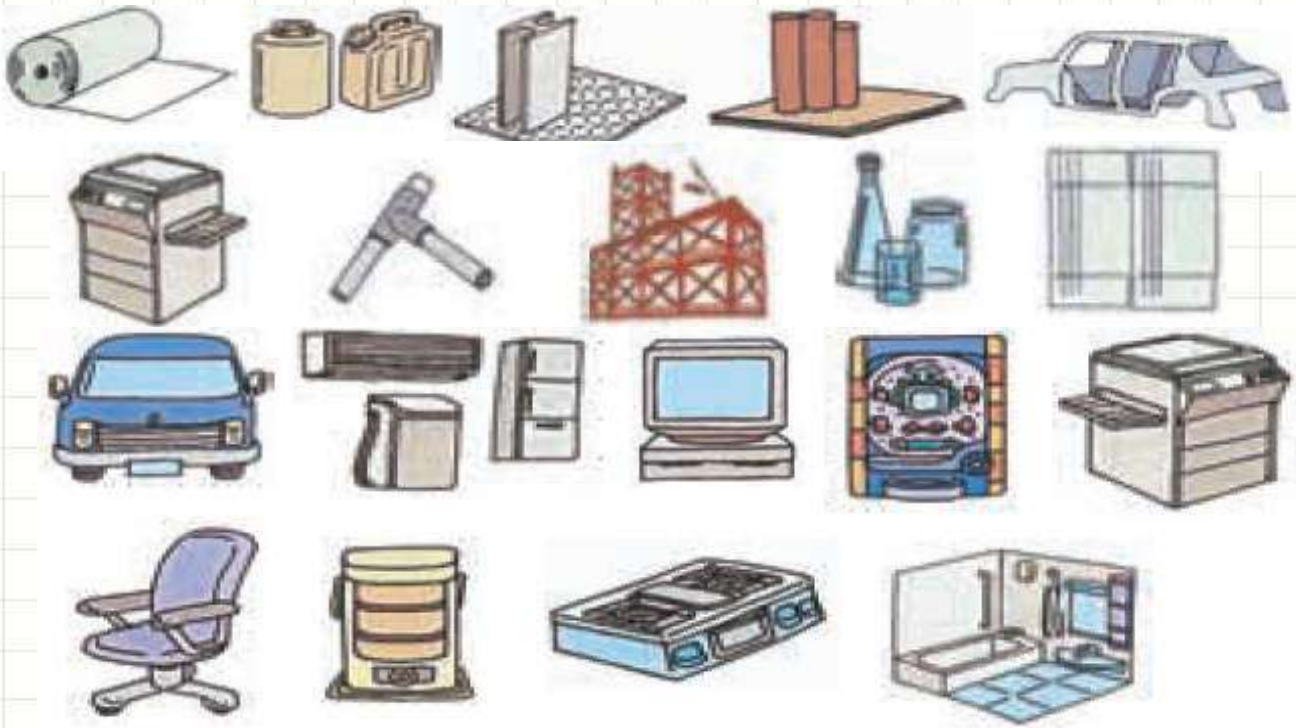
- Estimates amount of waste generation/treatment,
- Establishes basic policies related to reduction and treatment,
- Ensures proper management of general waste,
- Improves industrial waste management facilities, etc.

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

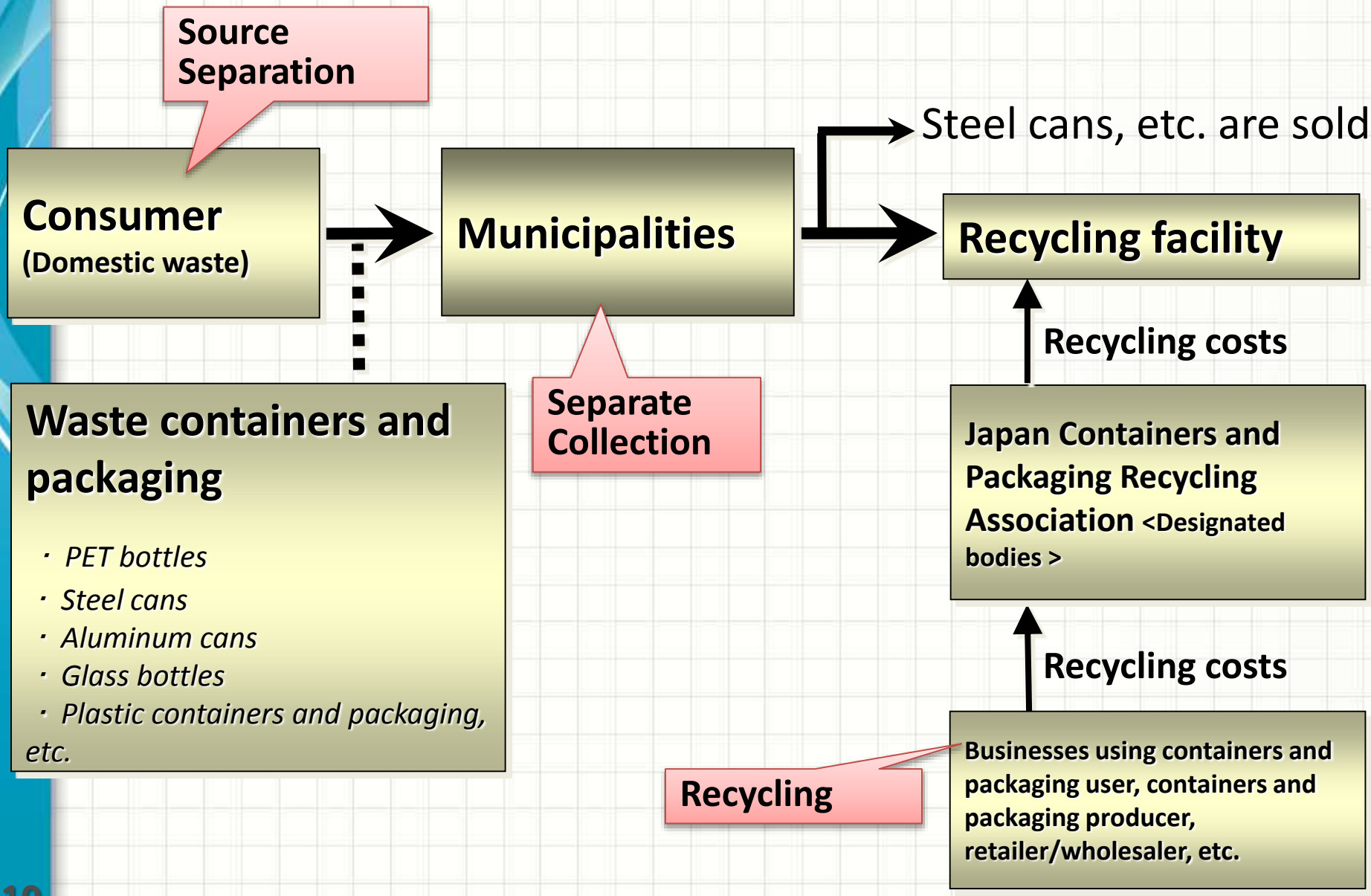
It states the standards of 3R efforts to be made by the producers



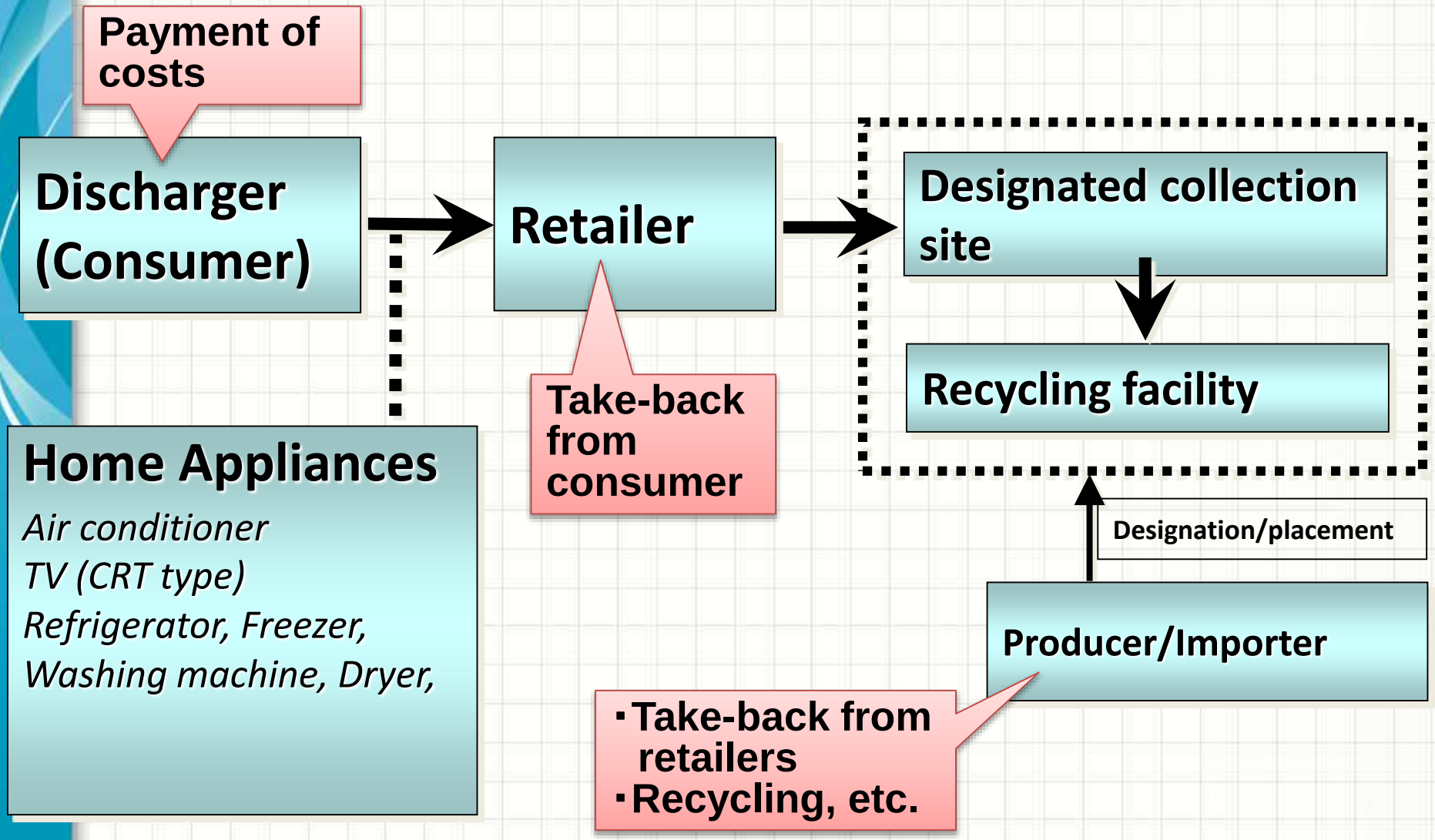
Regarding 69 products and 10 types of businesses.

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

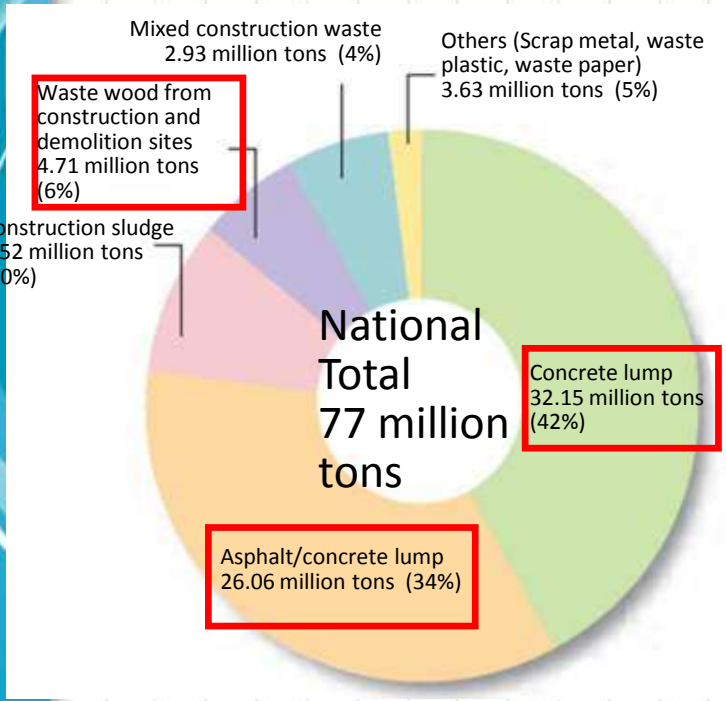
CONTAINERS AND PACKAGING RECYCLING LAW



HOME APPLIANCES RECYCLING LAW

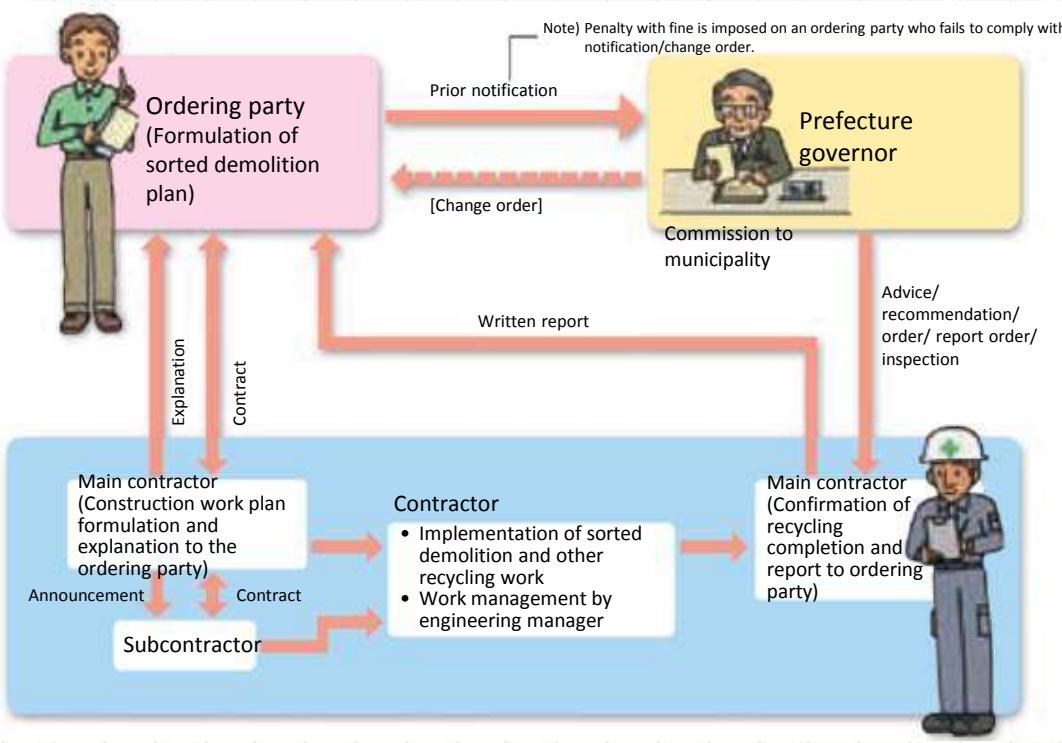


CONSTRUCTION MATERIALS RECYCLING LAW



Items to be recycled

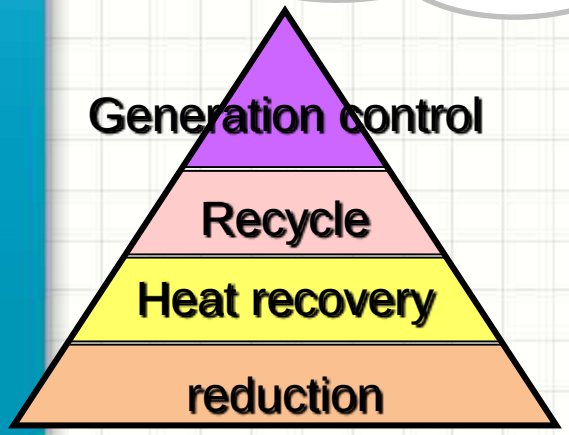
Order/implementation flow of sorted demolition/recycling



FOOD RECYCLING LAW

10 k tons (2013)	Amount of generation	Amount of recycled	Rate of recycling(%)
TTL of food industries	19.3	13.8	85
manufactures / processors	15.9	12.9	95
wholesales	0.2	0.1	58
retailers	1.2	0.5	45
Food service industries	1.9	0.3	25

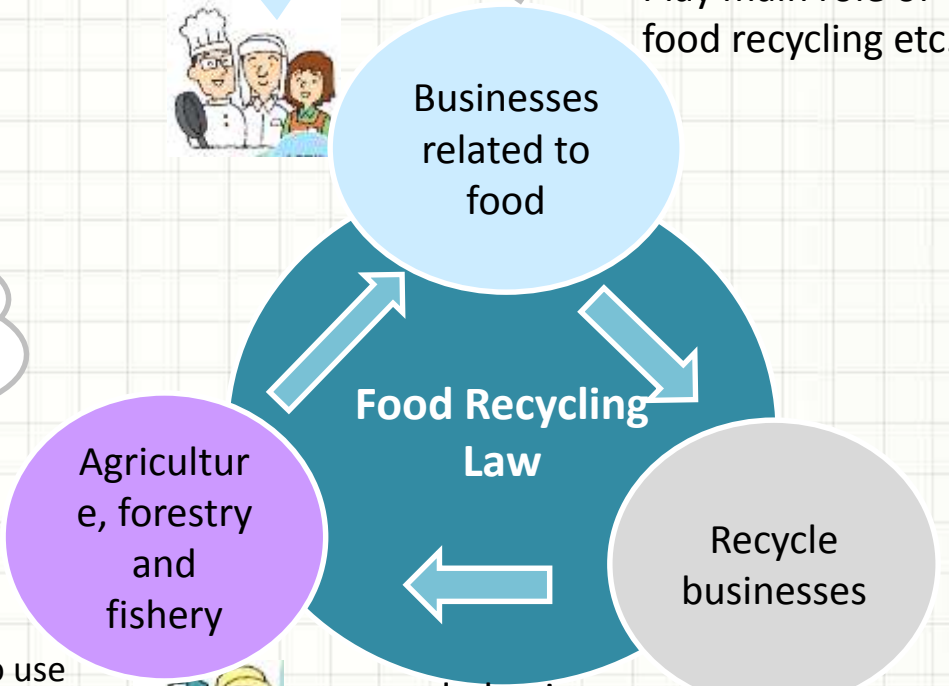
Food waste
- Processing residue
- unsold
- Cooking scraps, uneaten



- Food manufacturers/ processors
- Wholesalers/retailers
- Food service industries

Businesses which generated FW over 100 tons in the previous year should report the expected amount of generation and recycling plan to the Ministry

Play main role of food recycling etc.



endeavor to use fertilizer and feeds which are produced by food recycling, etc.

do business considering living environment, etc.

Source: pamphlet of Ministry of Agriculture, Forestry and Fisheries (partly retouched)

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 WEEEs RECYCLING LAW

(The Law on Promotion of Recycling Small Waste Electrical and Electronic Equipment)

From April 2013

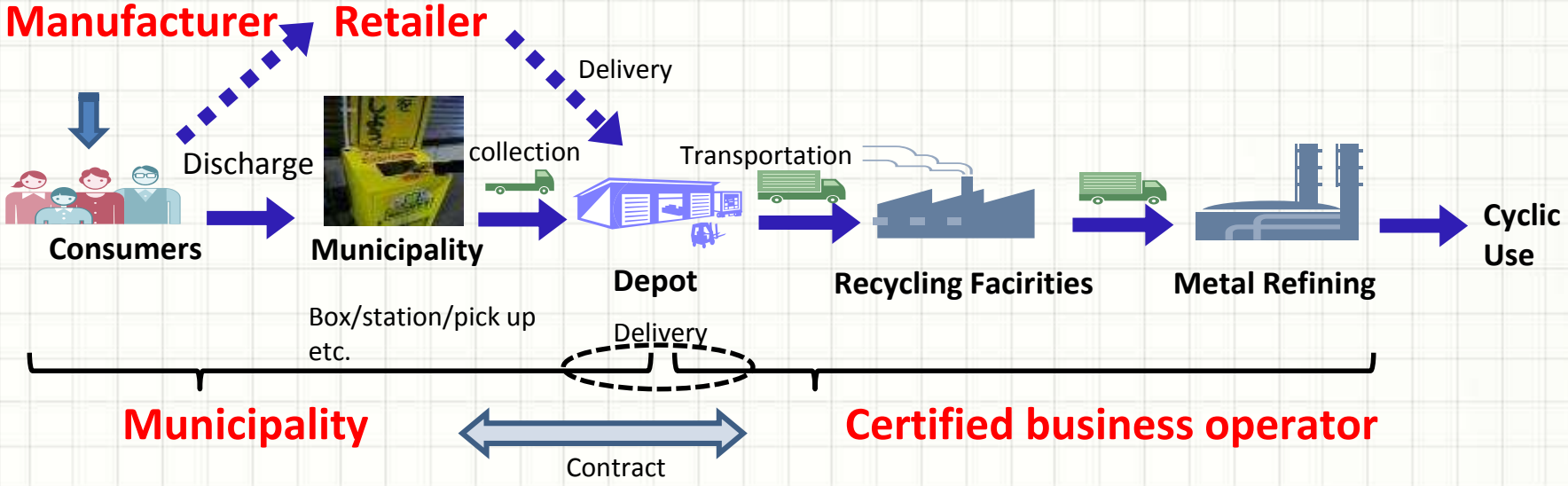
Background

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

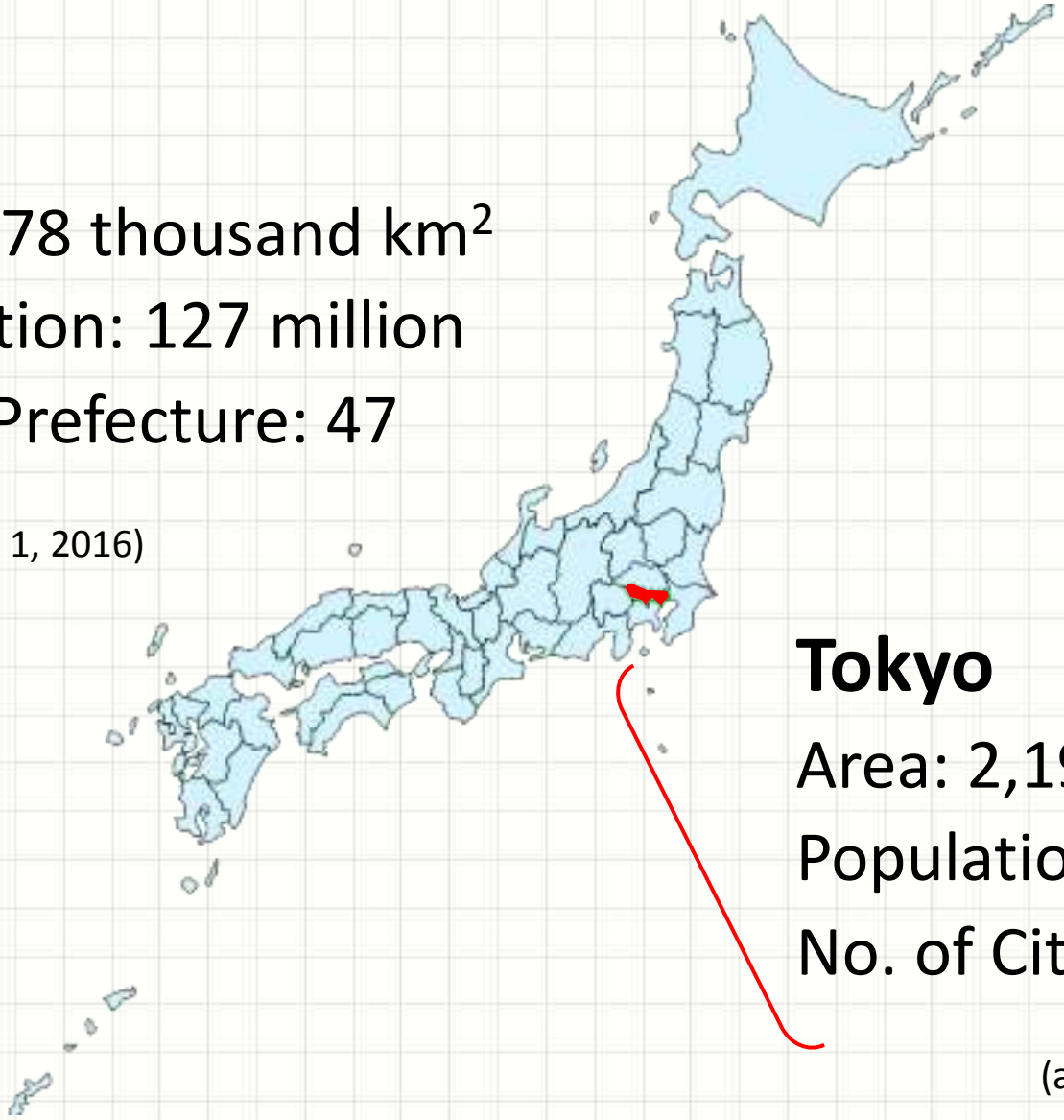
Japan

Area: 378 thousand km^2

Population: 127 million

No. of Prefecture: 47

(as of March 1, 2016)



Tokyo

Area: 2,190.9 km^2

Population: 13.5 million

No. of City: 62

(as of March 1, 2016)

TOKYO

Suburban area

“Tama area”

Area: 1,160 km^2

Population: 4,224,433

No. of municipalities: 30

Central area

“23-city area”

Area: 627 km^2

Population: 9,256,625

No. of municipalities: 23

We are here.

Island area

“Izu/Ogasawara islands”

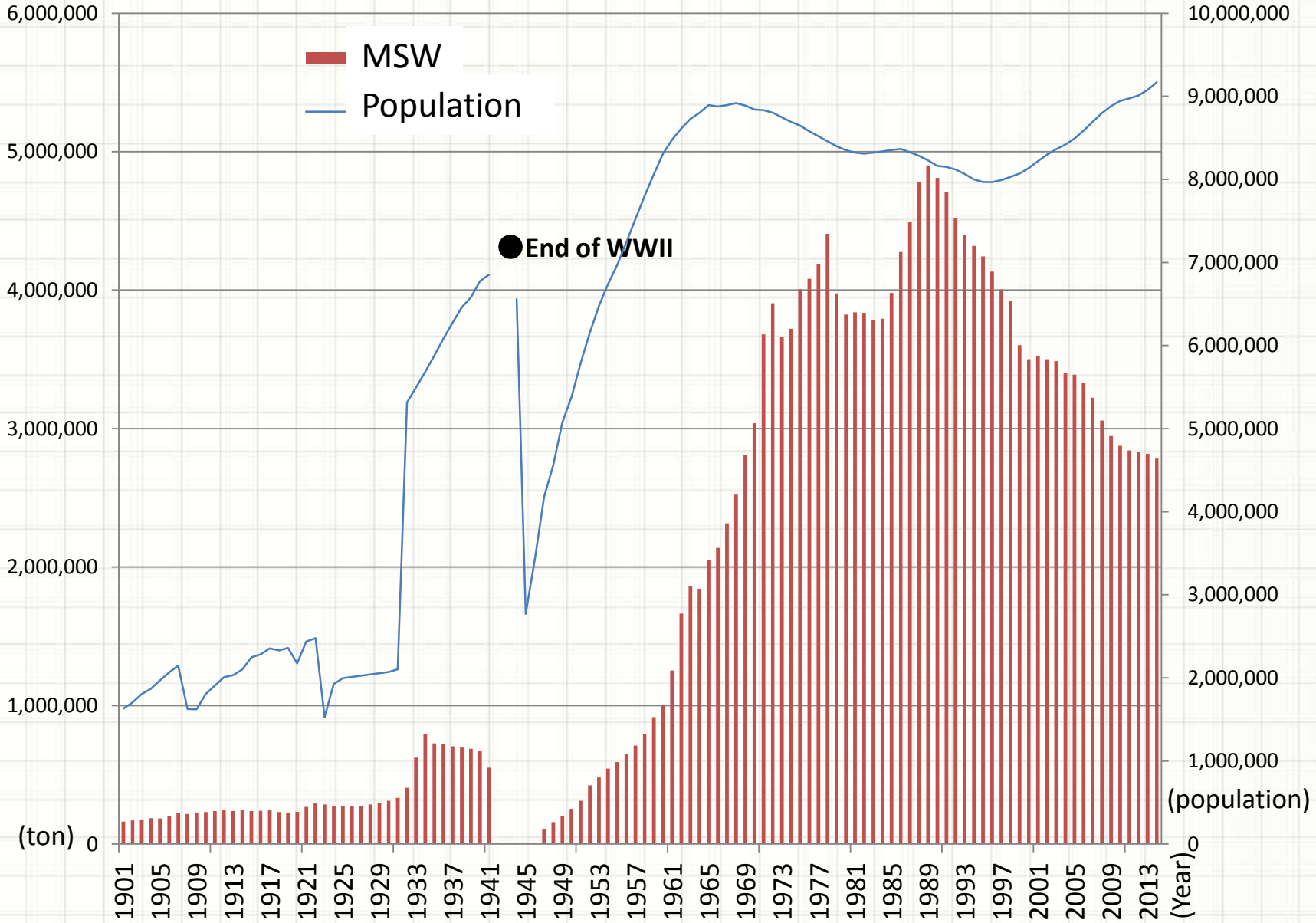
Area: 404 km^2

Population: 26,289

No. of municipalities: 9

As of 29st Jan 2016

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.

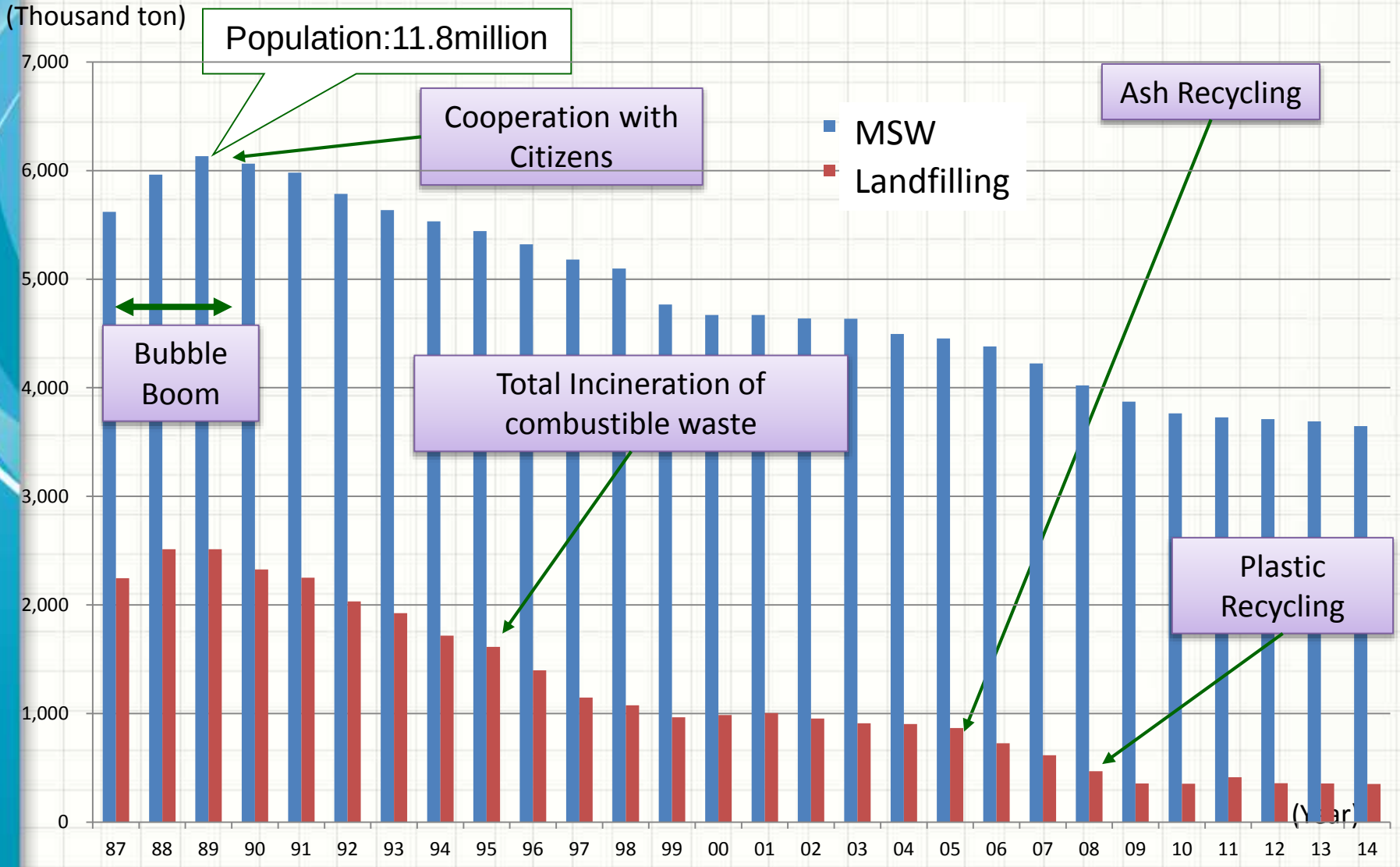
GARBAGE WAR 1970's

Don't bring garbage into my city

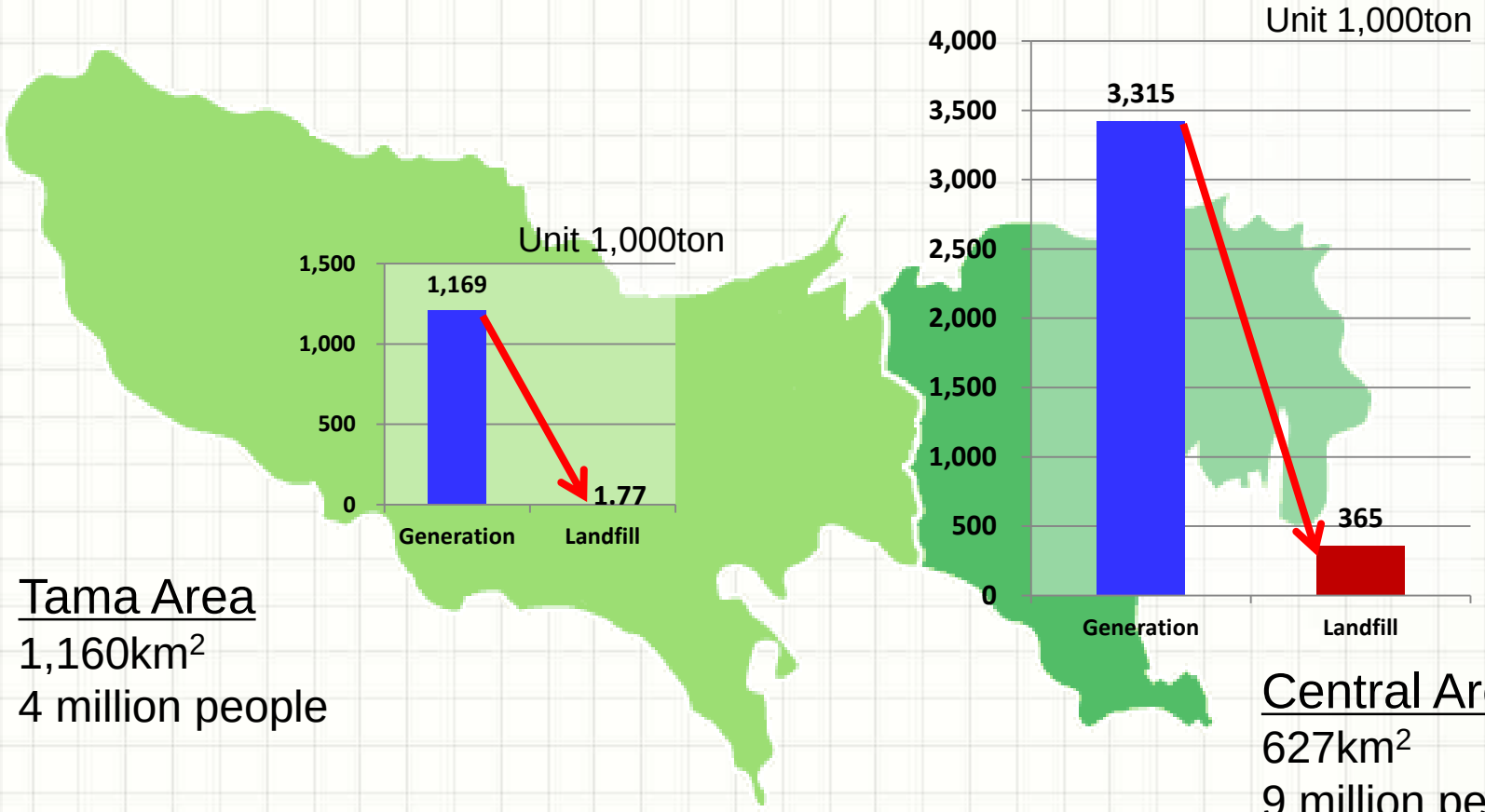
PEAK OF WASTE GENERATION (1989)

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
627km^2
9 million people

(in 2015)

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

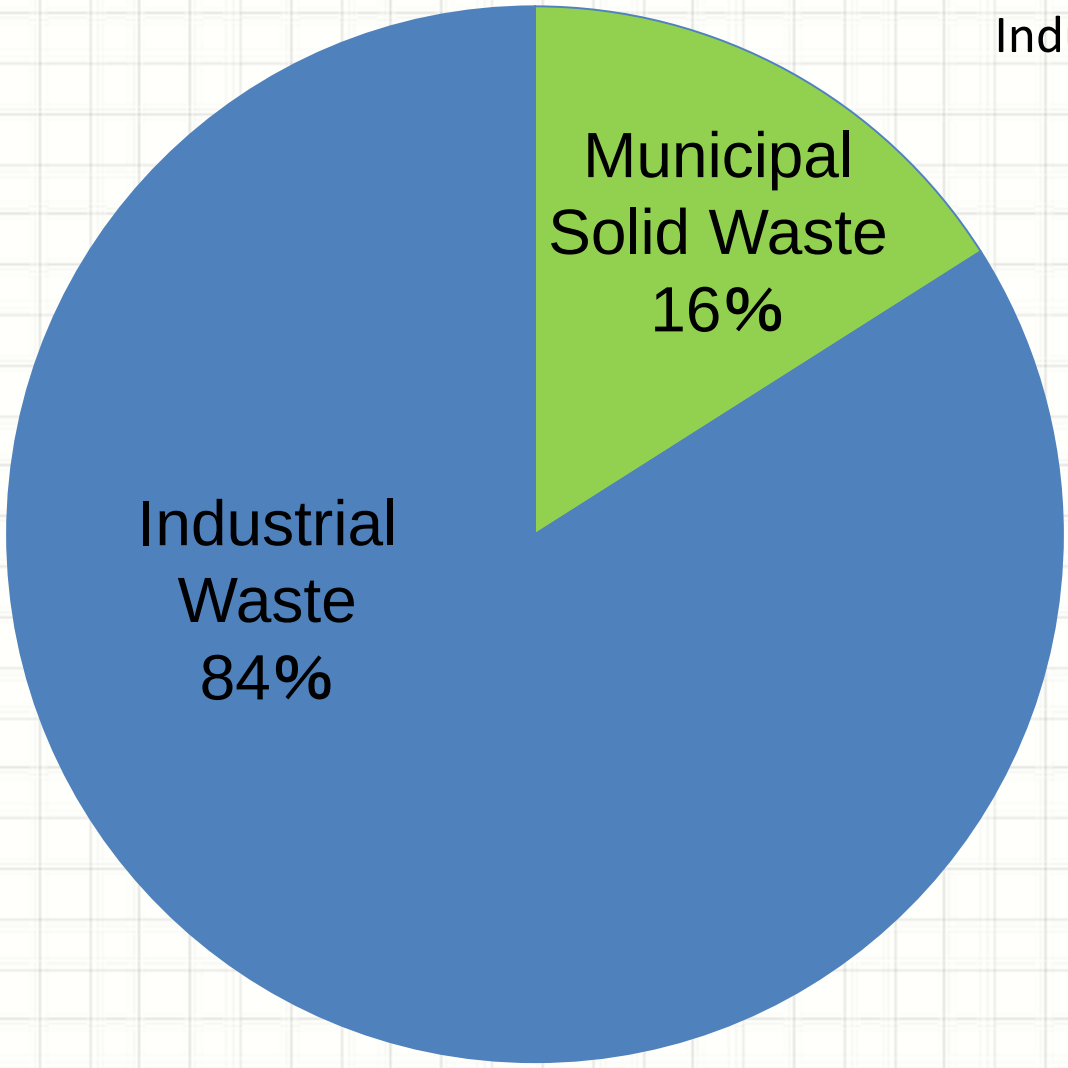
2-1 MSW

Waste Generation in Tokyo

77,200 t/day

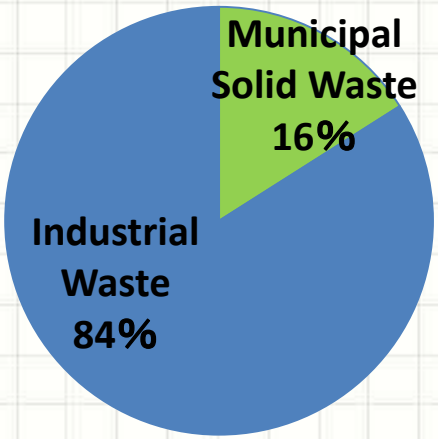
M S W : 12,300t/d

Industrial : 64,900t/d



In FY2015

MSW IN TOKYO 12,300T/D



Waste generated by

- Households
- Small businesses

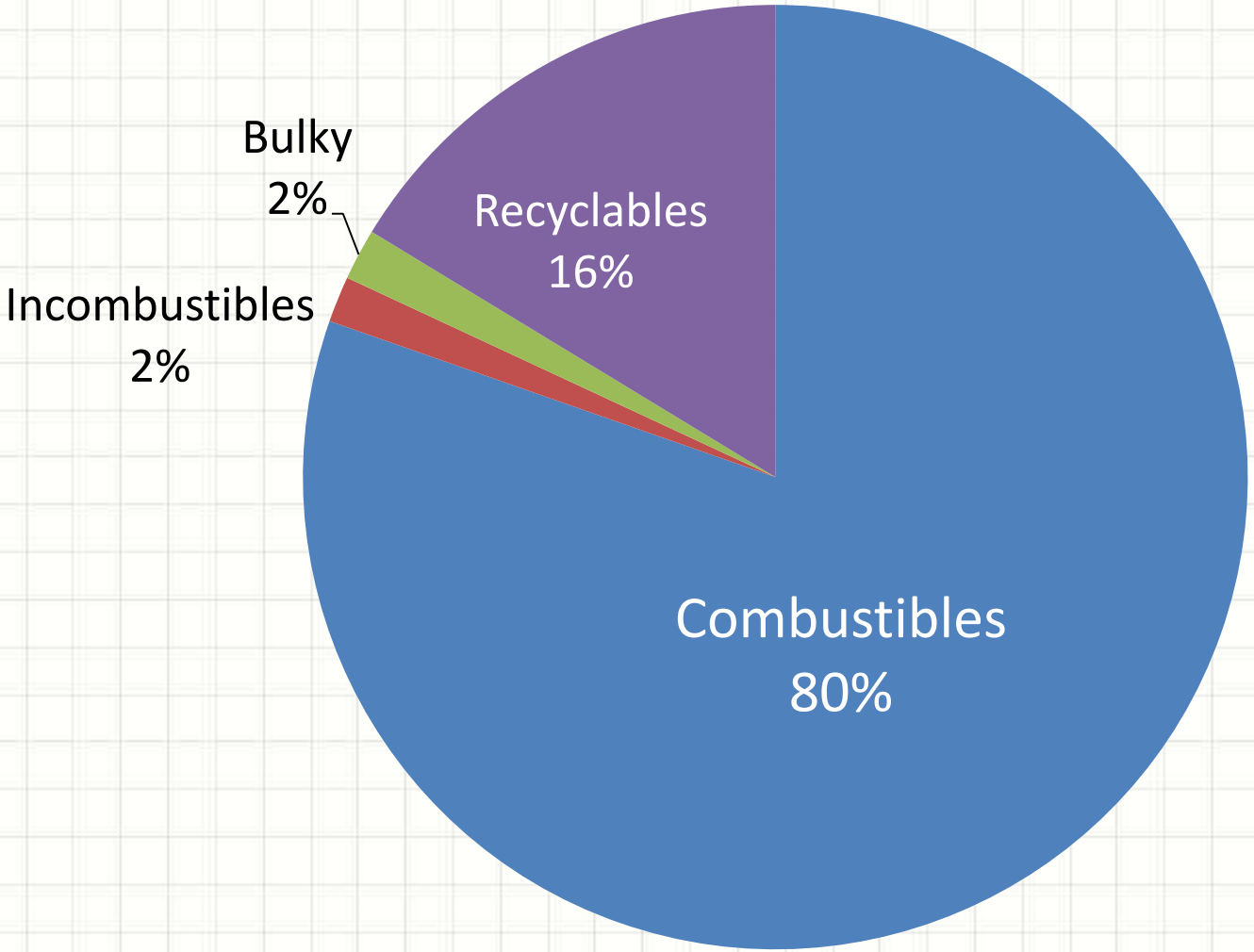
Managed and disposed by

Municipal Government

MSW MANAGEMENT

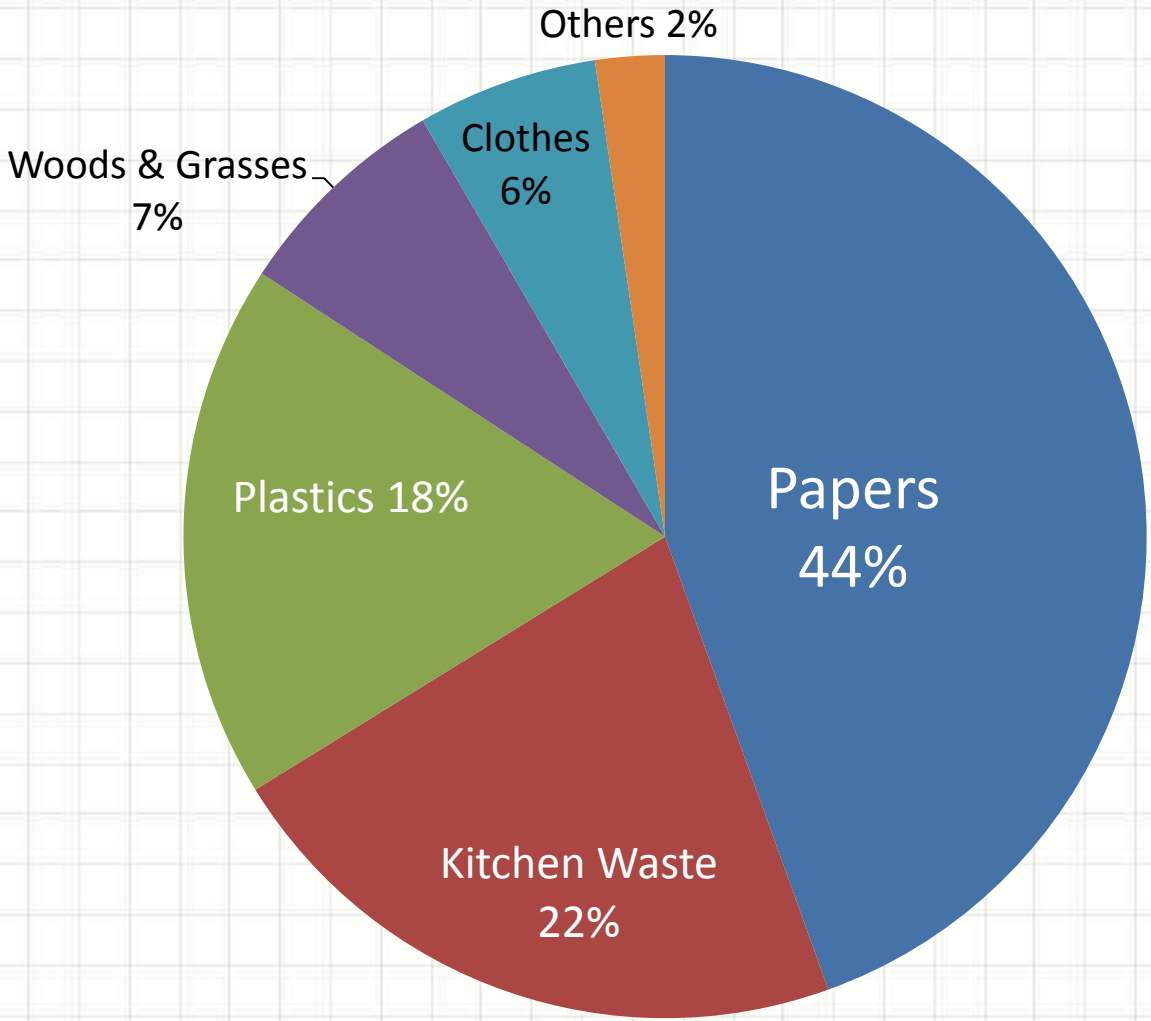
- Each municipal government has responsibility for MSW management
- Providing careful services to residents

RATIO OF MSW



23-city area (FY2016)
Source: “Waste Report23” 2018,
Clean Authority of TOKYO

COMPOSITION OF COMBUSTIBLE WASTE

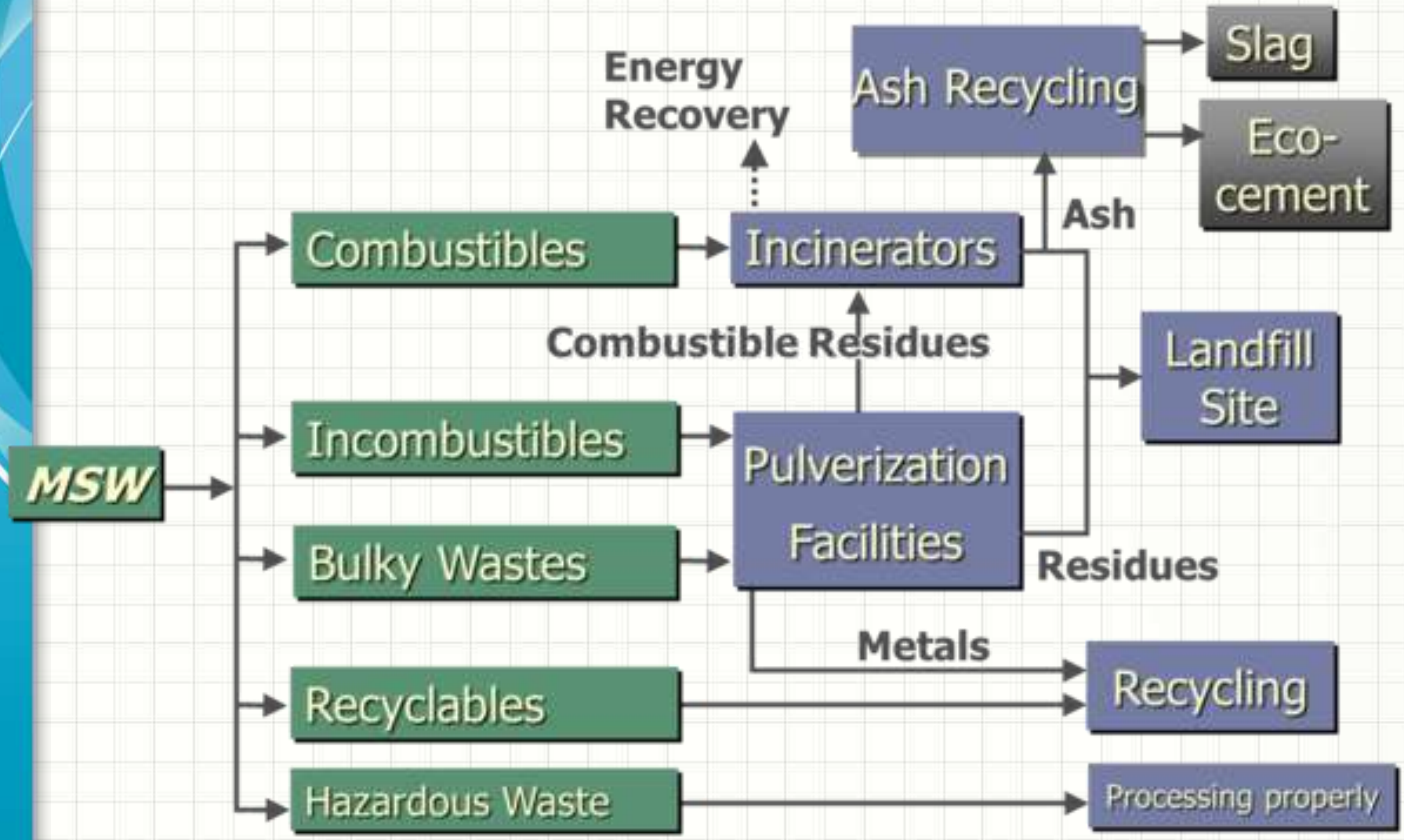


23-city area (FY2016)
Source: “Waste Report23” 2018, Clean Authority of TOKYO

The MSW Flow in Central Tokyo (23 cities)

Residents	Each city	Clean Authority of TOKYO	Tokyo Metropolitan Government
Source Separation &3Rs	Collection & Transport	Incineration & Shredding	Final Disposal

CURRENT MSW FLOW



Source Separation by Residents

Recyclables and garbage collection point in the community

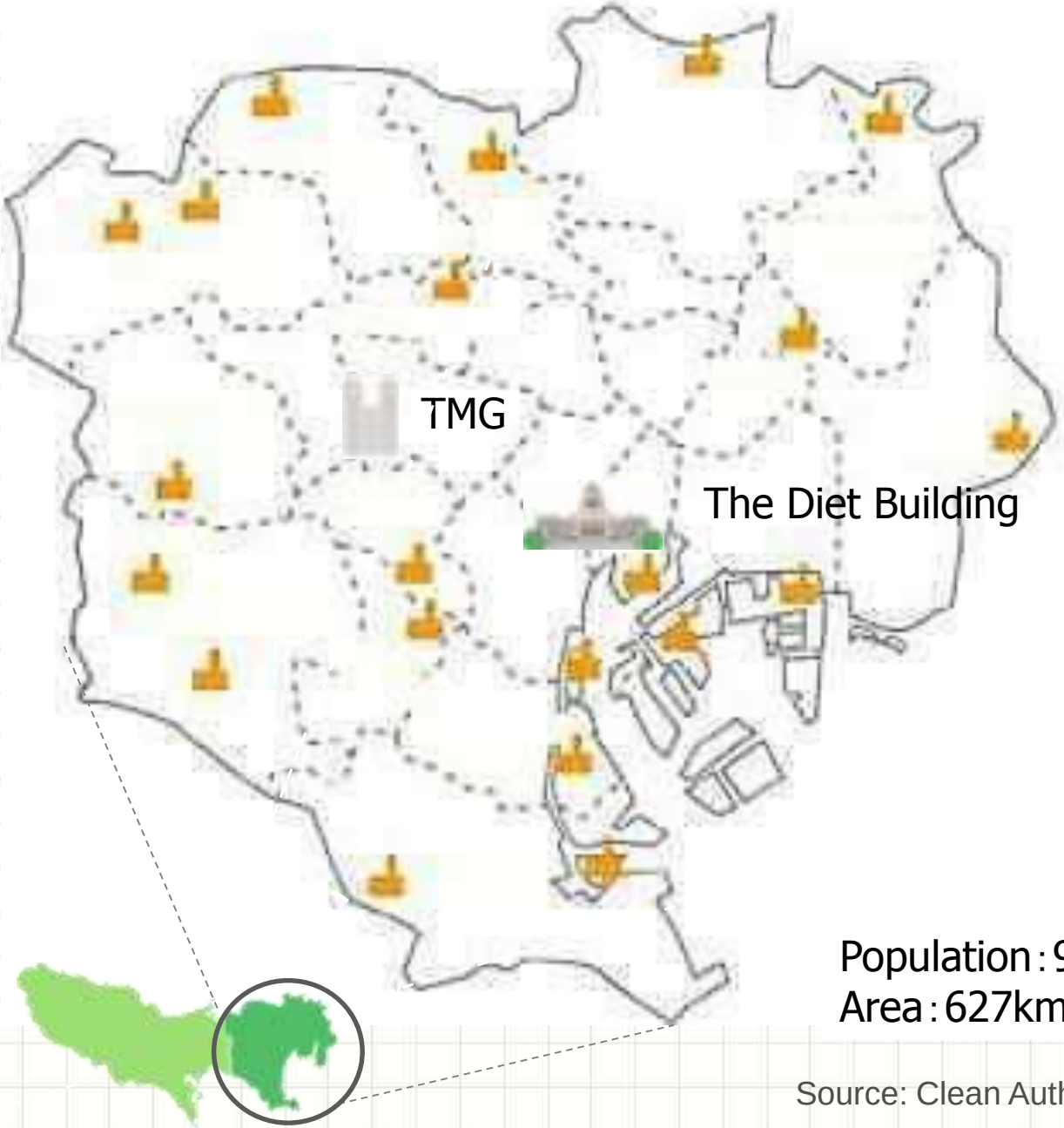
VOLUNTARY RECYCLING ACTIVITIES

Sign: Collection point for recyclables

CONTINUOUS COMMUNICATION

ENVIRONMENTAL EDUCATION

21 Incineration Plants in 23 cities



Population : 9million
Area : 627km^2

Source: Clean Authority of TOKYO

Feature of Incineration Plant in 23 cities

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

All incineration plants in 23 cities
- equipped with power generator

Total Generated Power	1.20 billion kWh
Electricity sold	690 million kWh
Income from electricity sold	9.80 billion yen
Supplied heat(Charged)	415,000 GJ
Income from heat sold	186 million yen

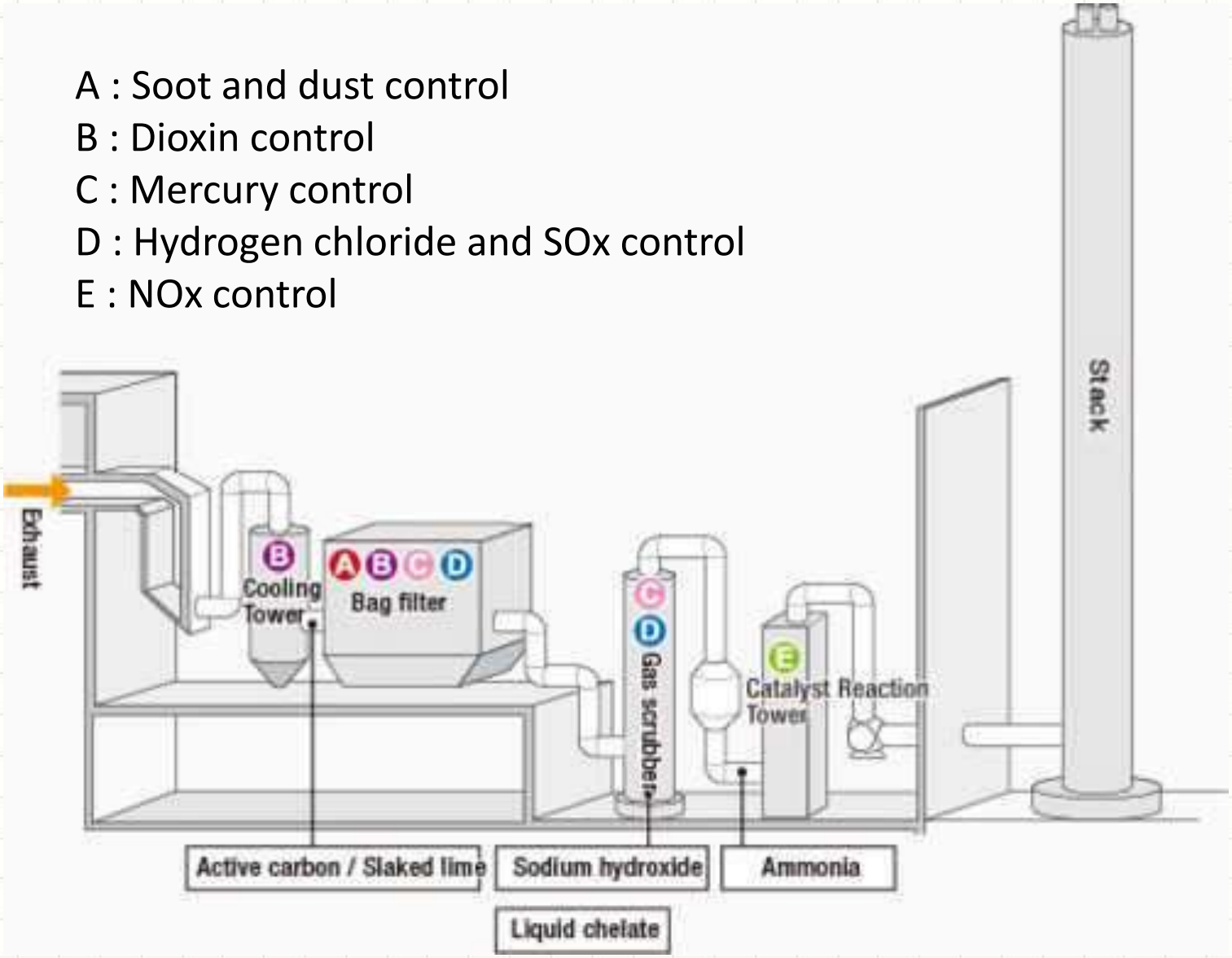
(FY2016)

- have certificate of ISO14001

Source: “Waste Report 23” 2018
Clean Authority of TOKYO

POLLUTION CONTROL OF SYNGAS

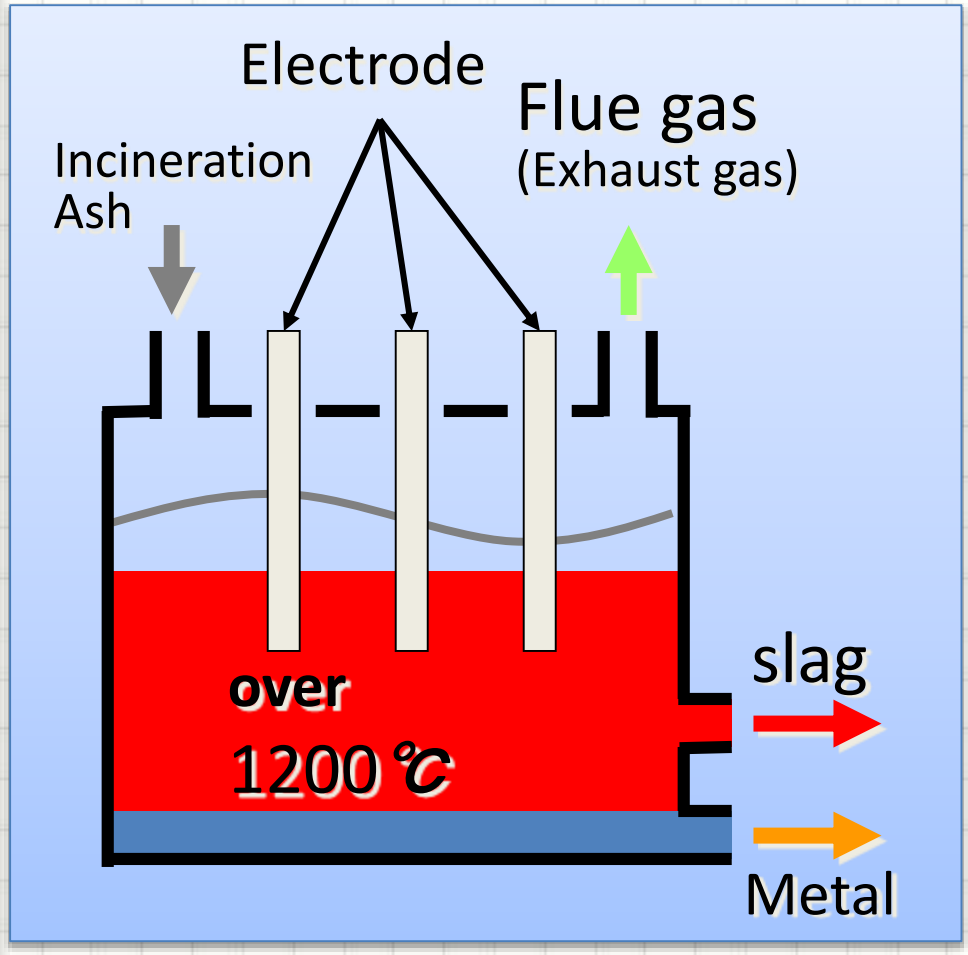
A : Soot and dust control
B : Dioxin control
C : Mercury control
D : Hydrogen chloride and SOx control
E : NOx control



Source: Clean Authority of TOKYO

ASH RECYCLING - ASH MELTING

(23-city Area)



Ash Melting Furnace (Arc type)

Slag

Used for
construction material

Source: Clean Authority of TOKYO

ASH RECYCLING - ECO CEMENT (Tama Area)

Eco-cement

Used for construction material

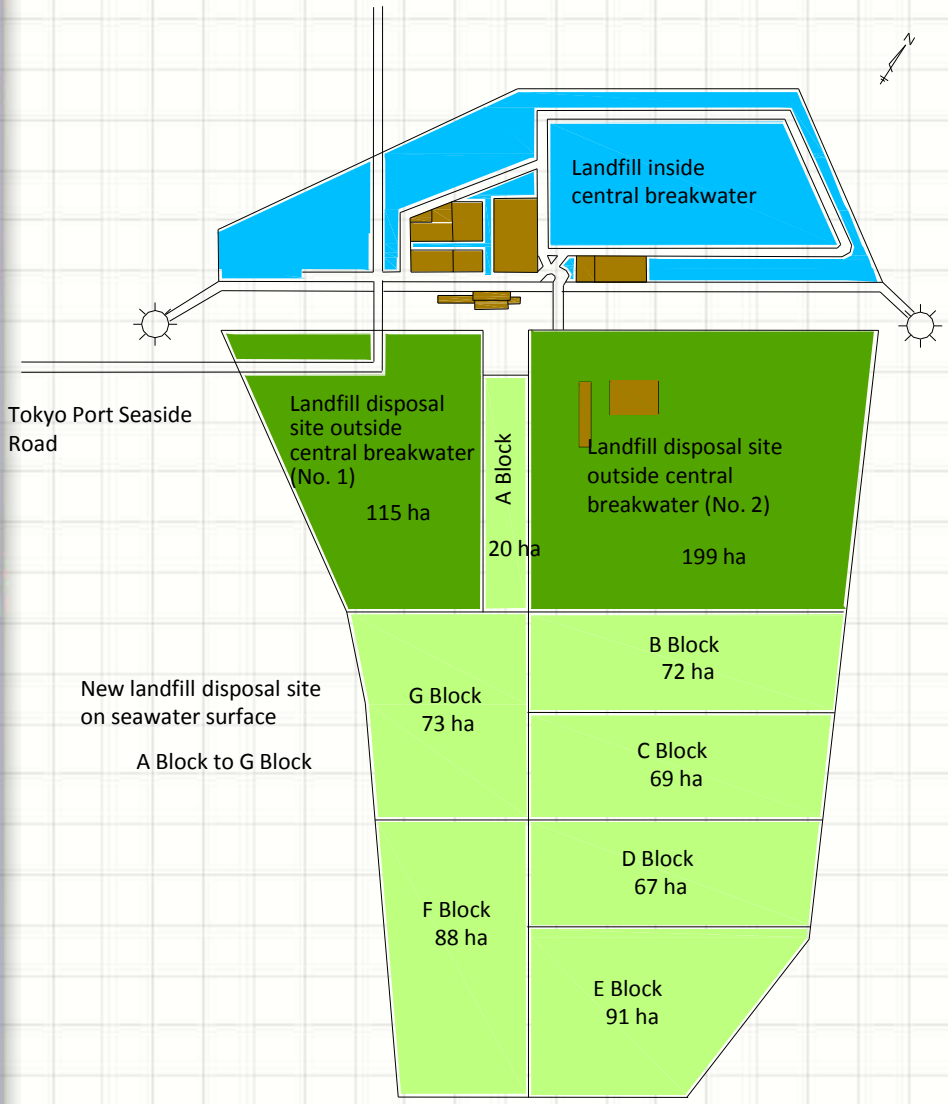
Source: Tokyo Tama Regional Association for Waste Management and Resource Recycling

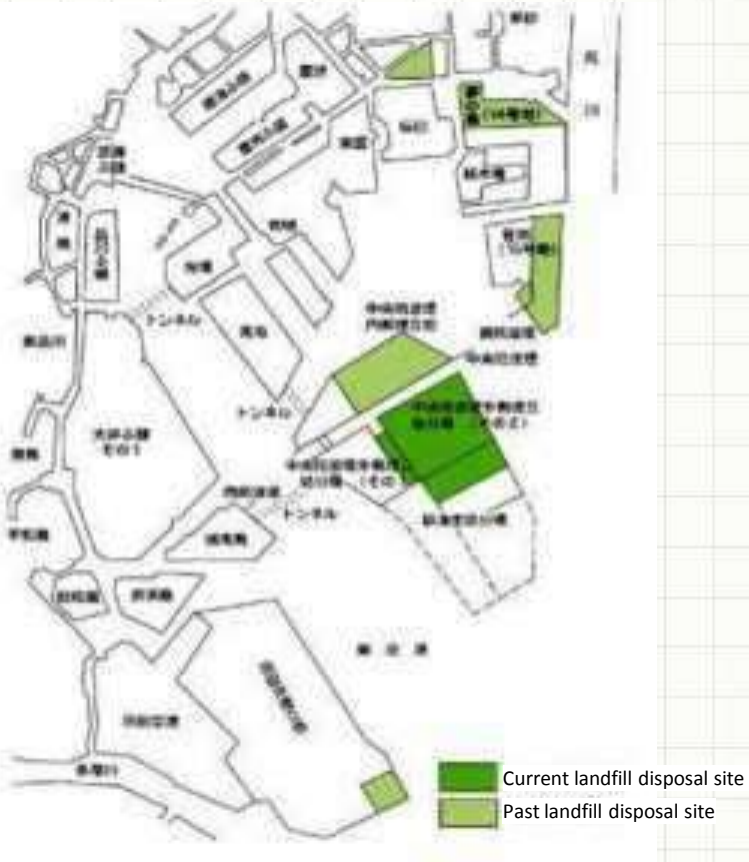
Final Disposal Site(FDS) in Tokyo Bay

Photo: Bureau of Environment, TMG

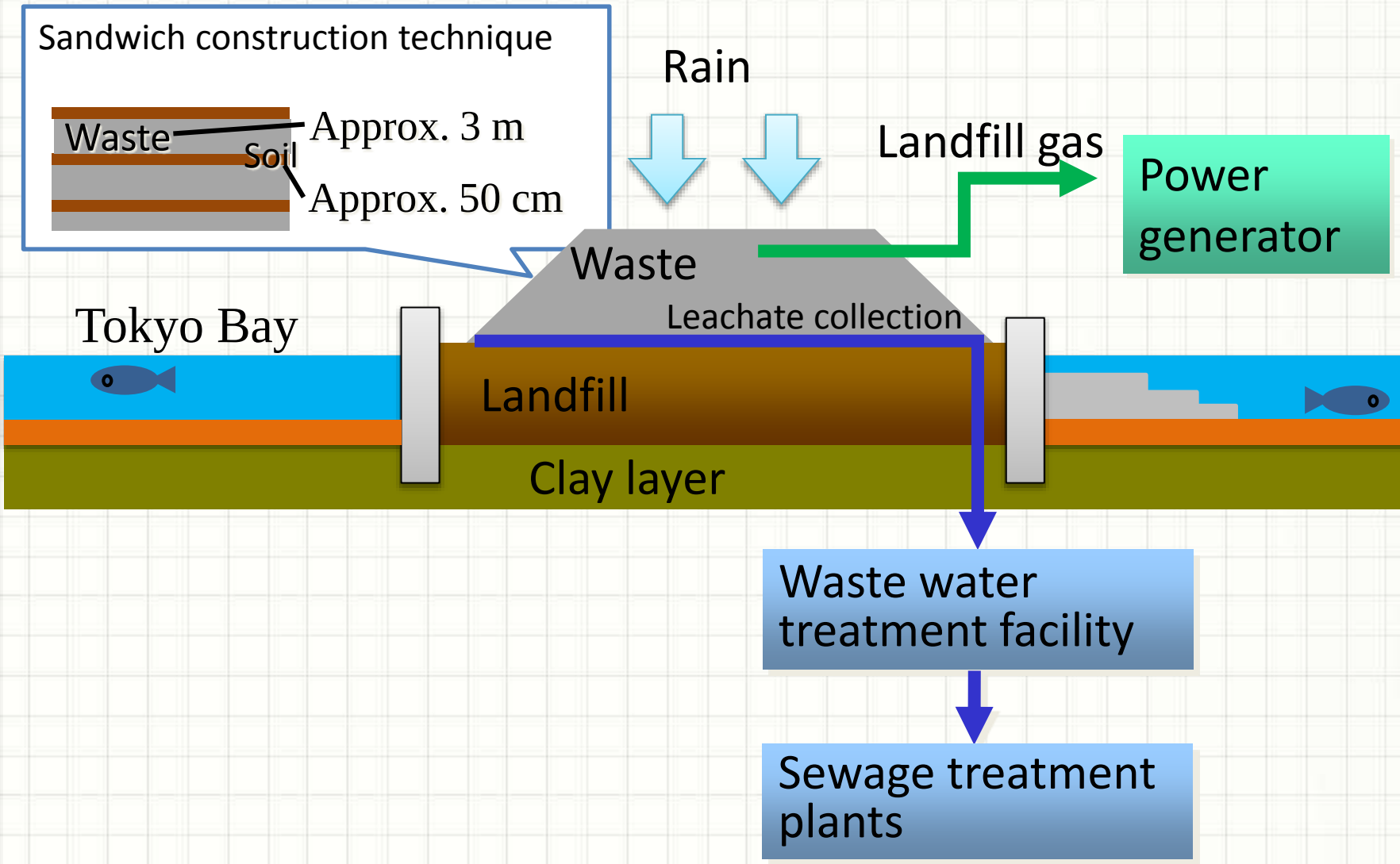
FDS

CENTRAL BREAKWATER OUTER LANDFILL SITE / NEW SEA SURFACE DISPOSAL SITE





STRUCTURE OF FDS



ENVIRONMENTAL EDUCATION AT FDS

50,000 visitors /year
(46,000 Elementary/Junior High School students included) (as of 2016)

2. 3Rs & Waste Management in Tokyo

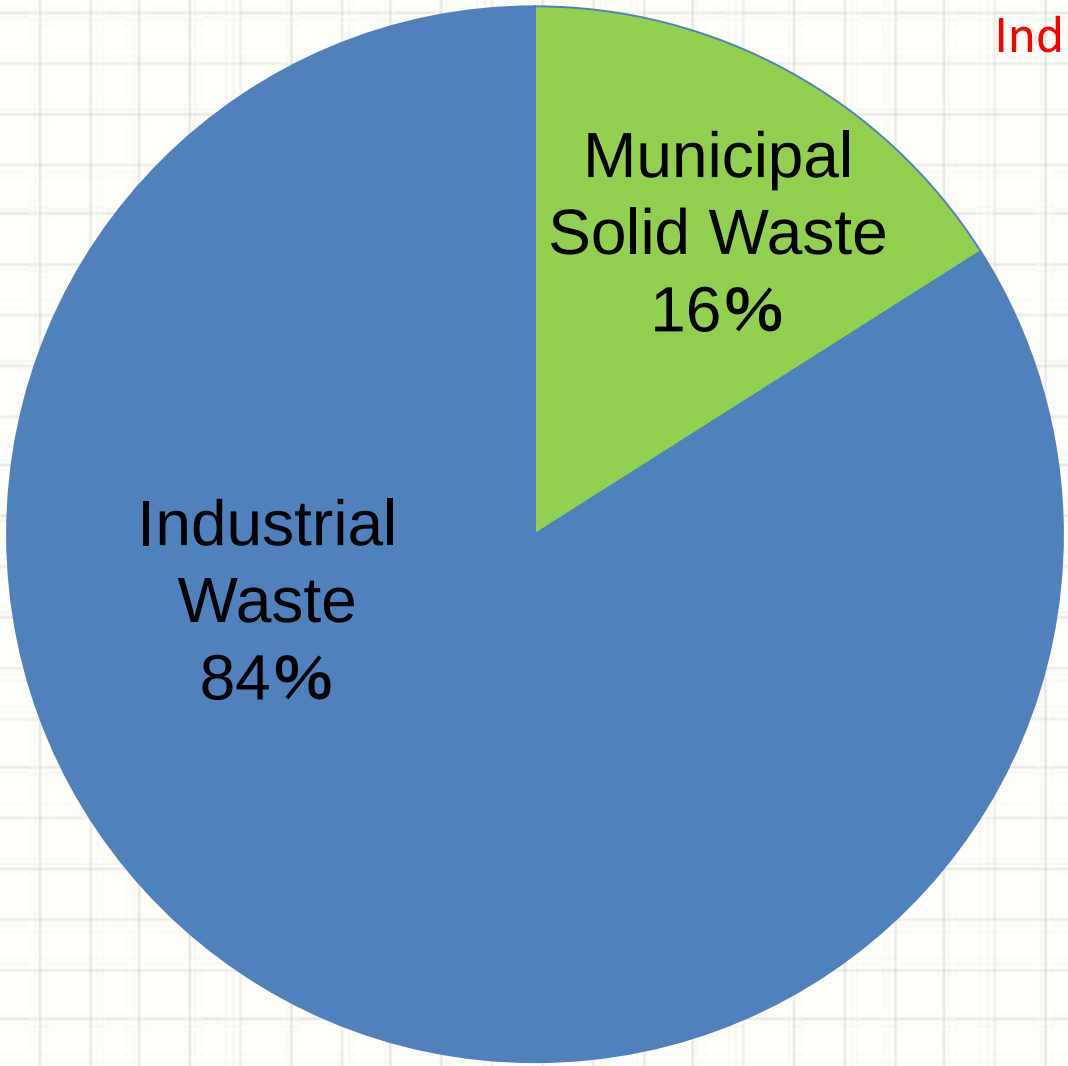
2-2 Industrial Waste

Waste Generation in Tokyo

77,200 t/day

M S W : 12,300t/d

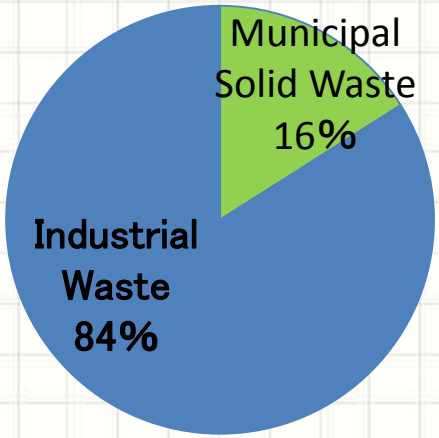
Industrial : 64,900t/d

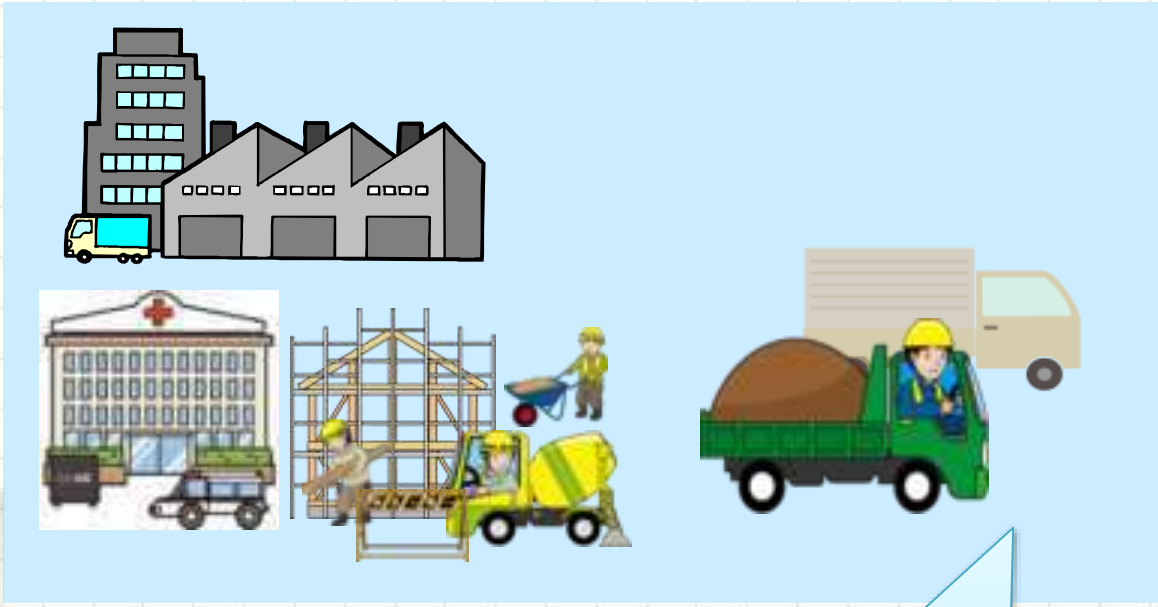


In FY2015

Industrial Waste in Tokyo 64,900t/d

Waste Generation in Tokyo

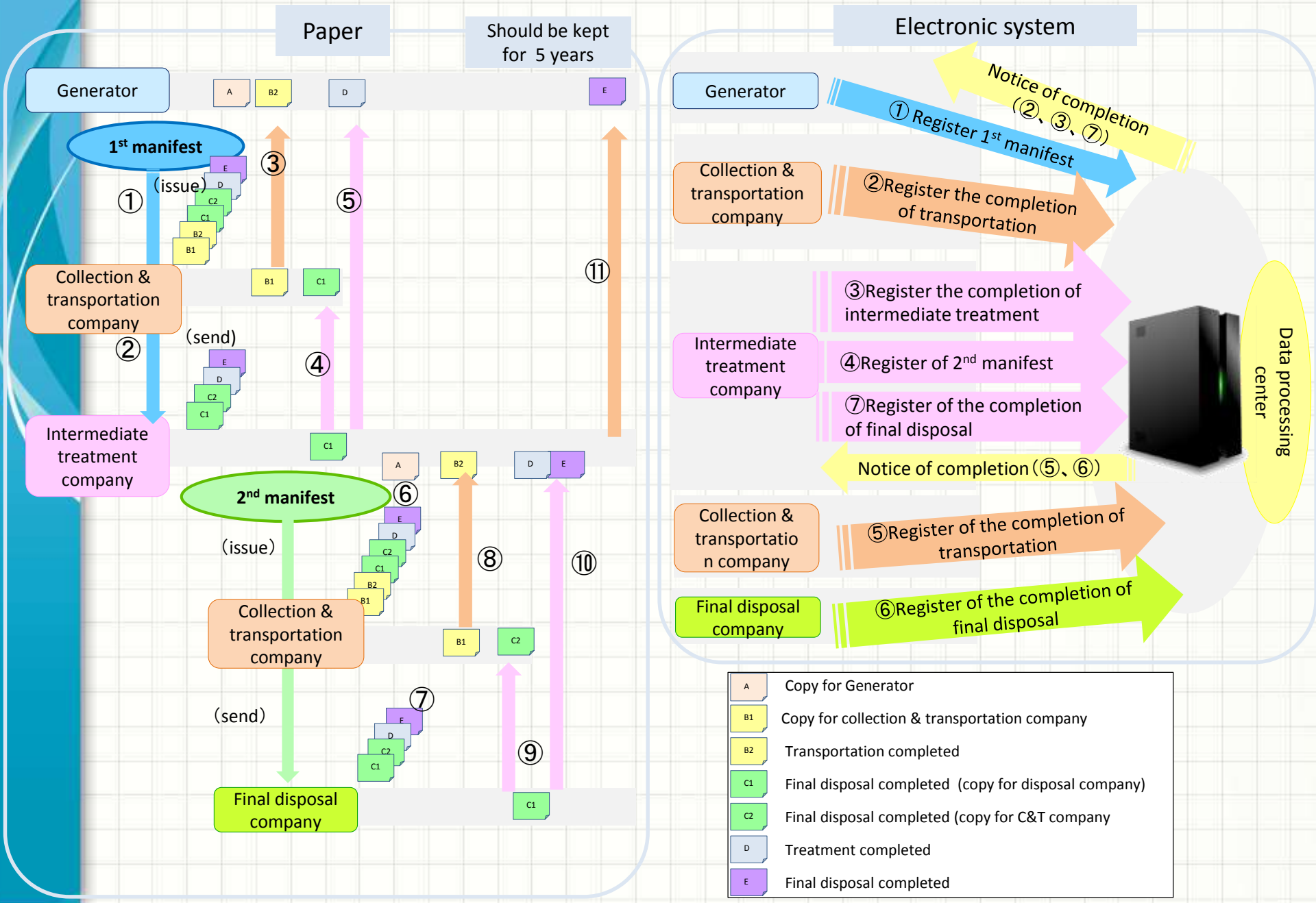




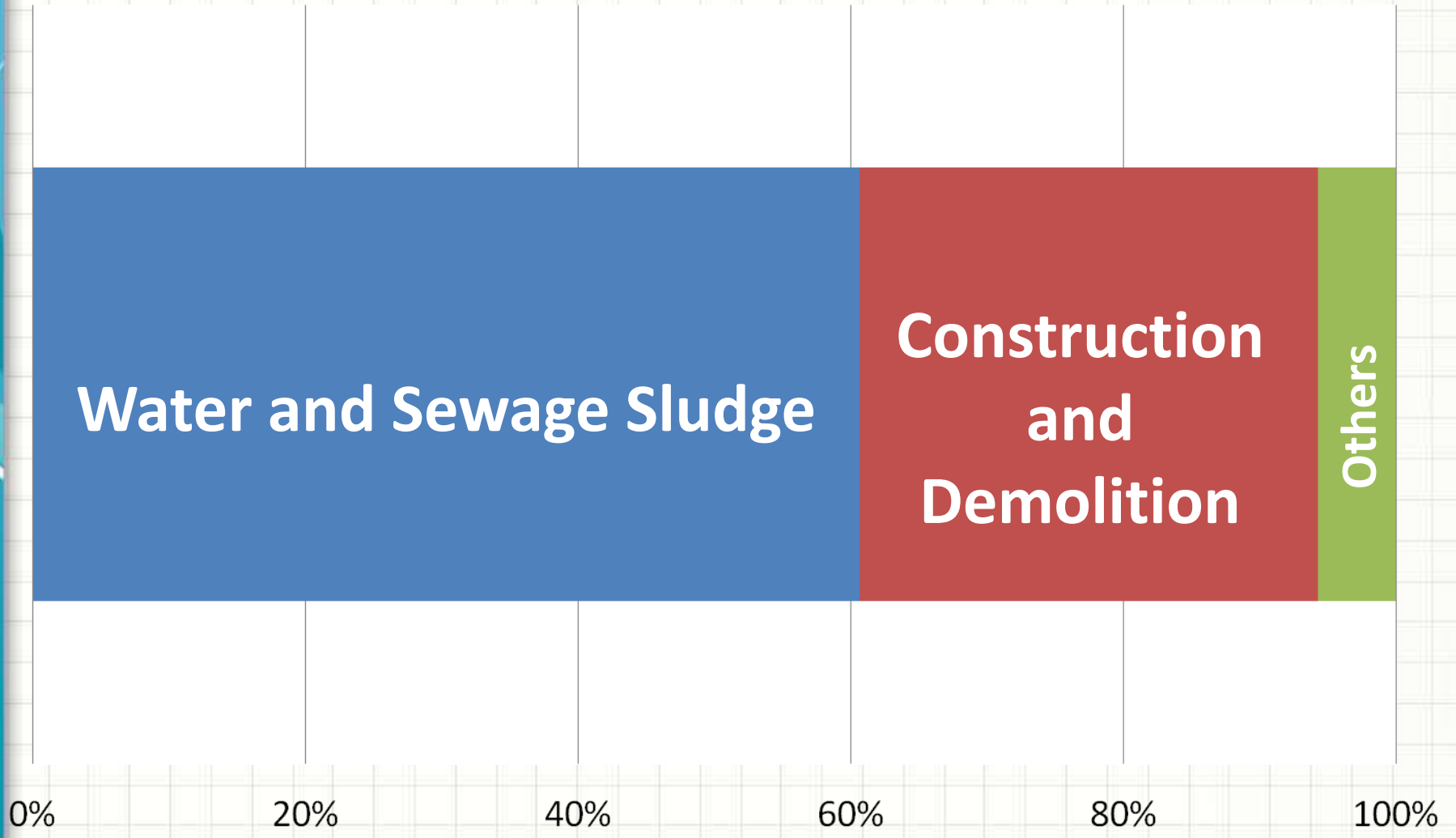
Generator has responsibility
for proper disposal

Disposed by private sector
licensed by Prefectural Government

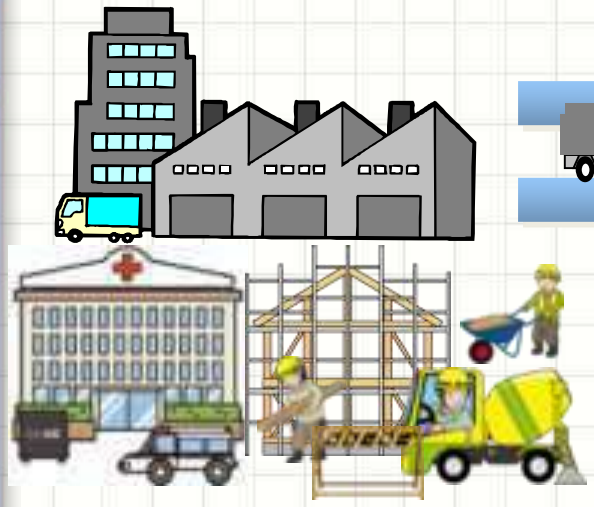
Flow of Manifest of Industrial Waste （standard model case）



Composition of Industrial Waste



Disposal Flow of Industrial Waste



Waste Generation
23.7 million tons / year

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

Intermediate Treatment
23.6 million t/y
(99.8%)

- Dehydration,
- Shredding,
- Incineration, etc.

Final Disposal
572,000 t/y
(2.4%)

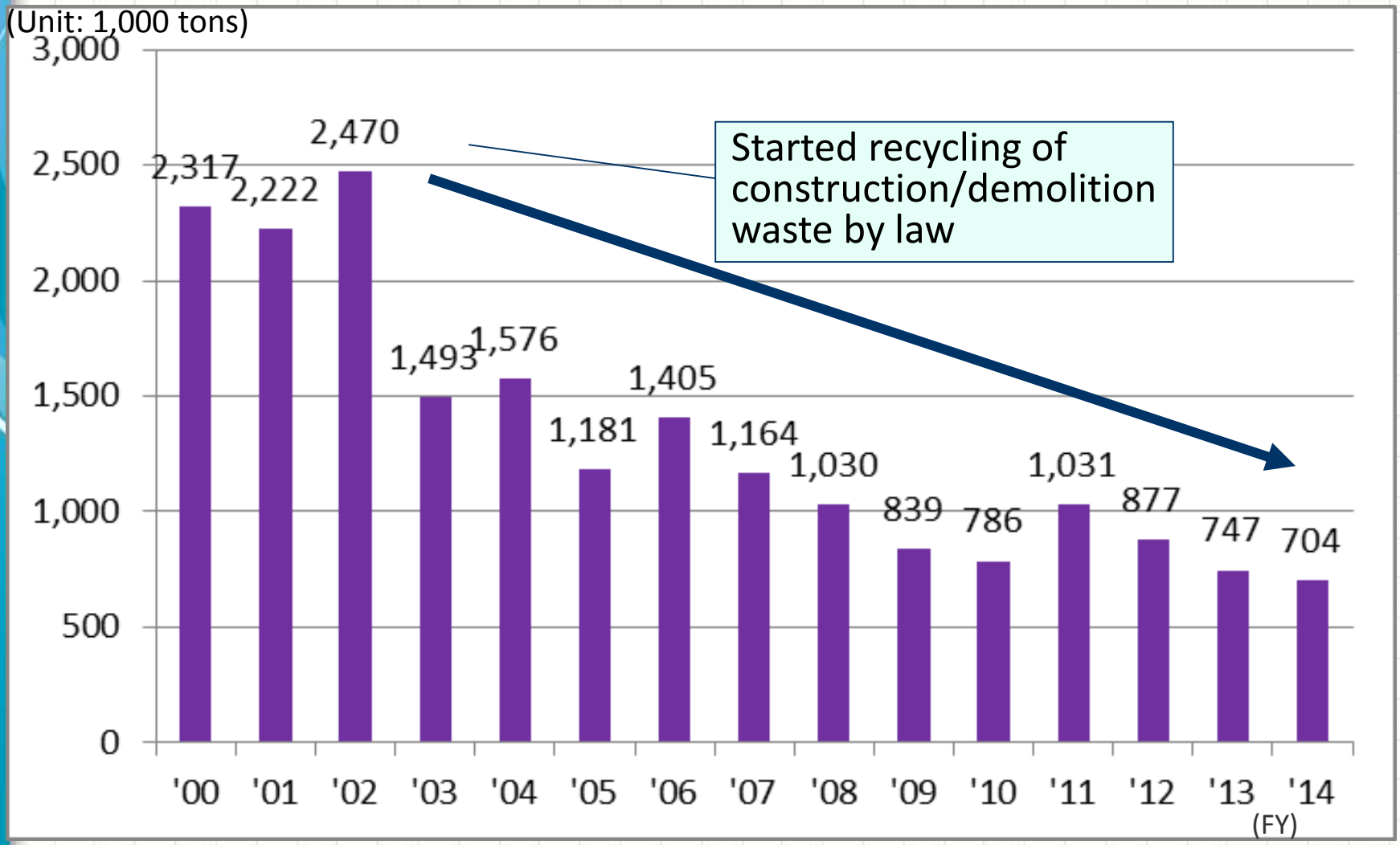
Recycling
9,604,000 t/y
(40.5 %)

(in 2015)

■ Licensed Private Company

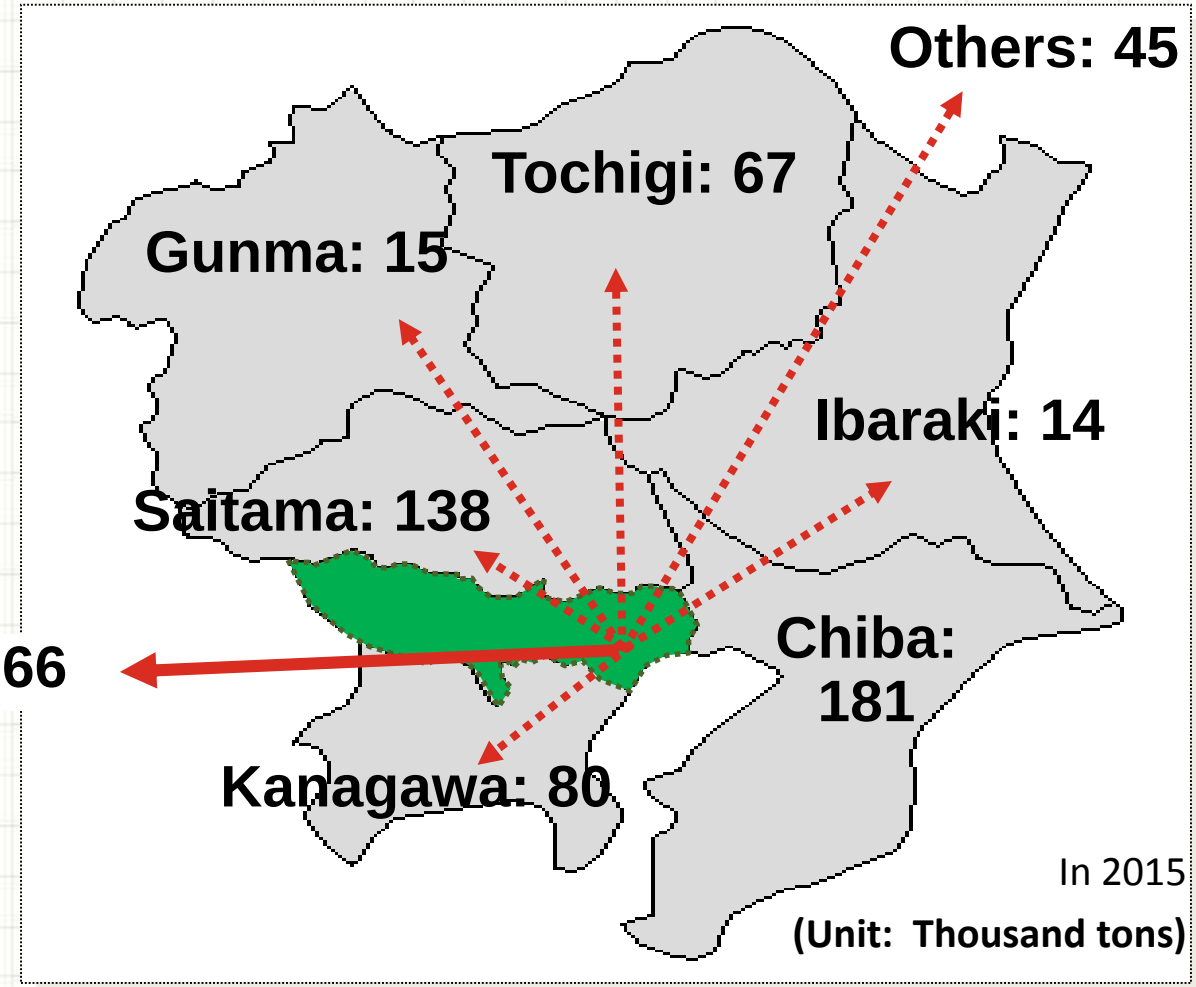
(Issued by Prefectural Government)

Reduction of Final Disposal of Industrial Waste



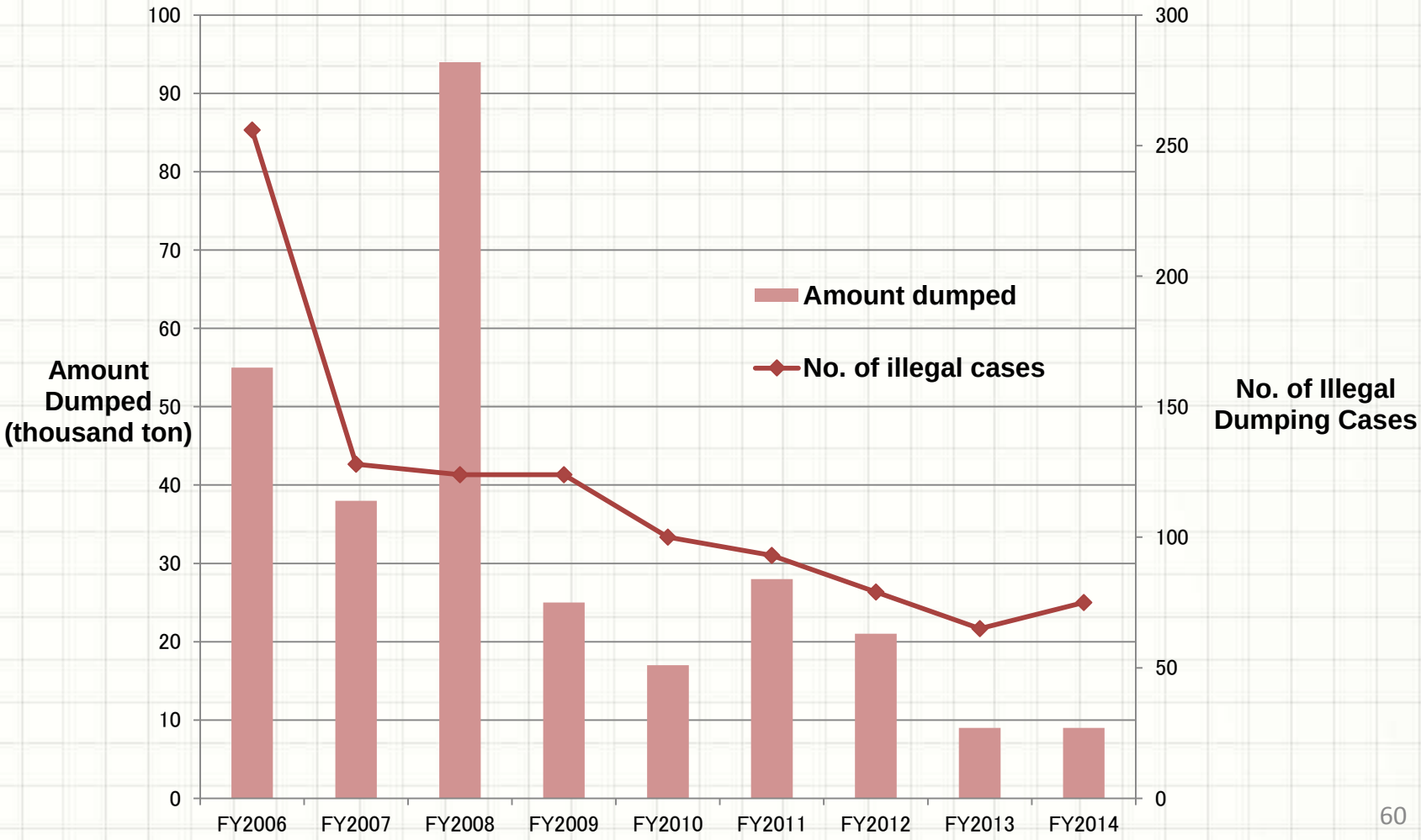
<CHALLENGE 1>

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

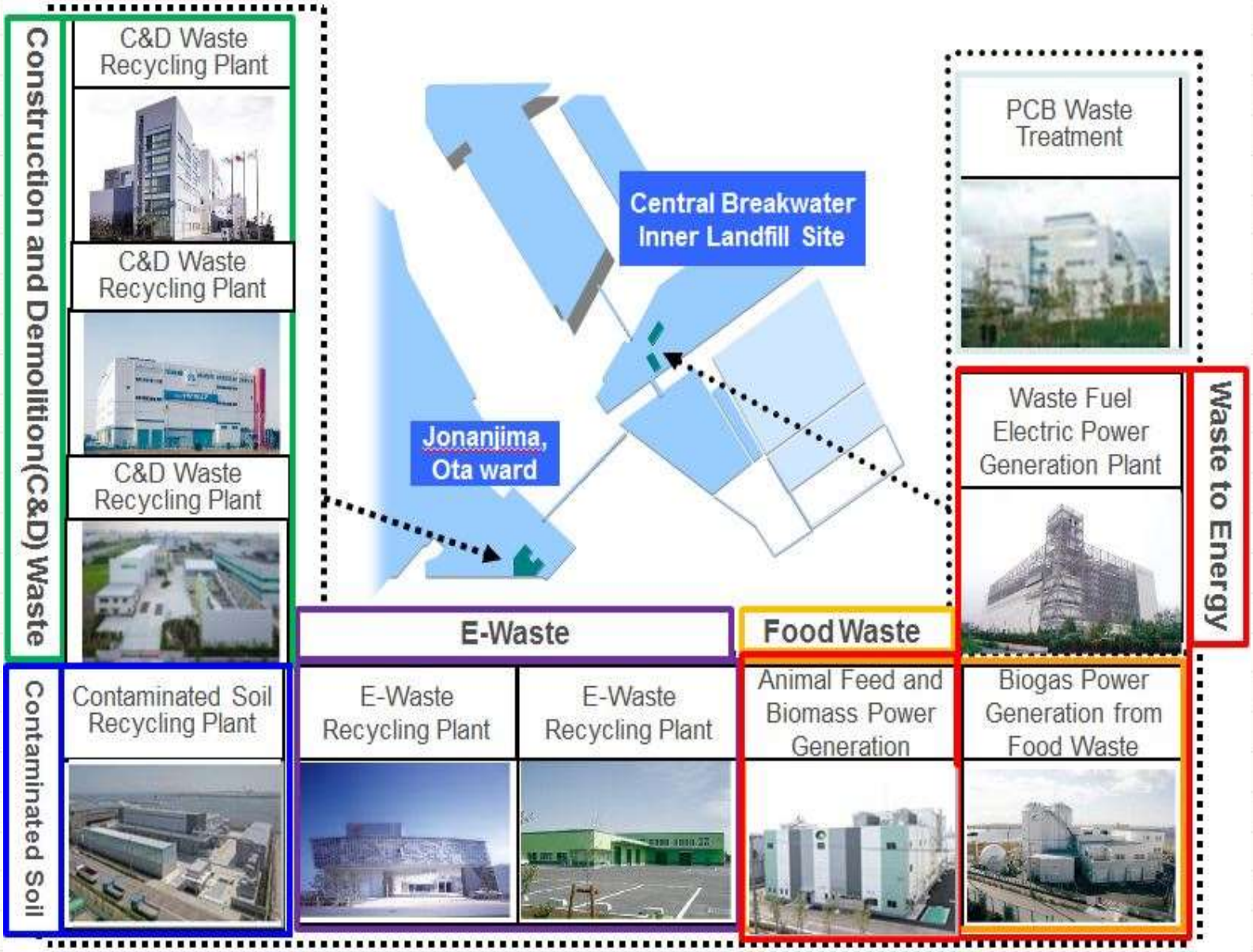
Aerial photo of illegal dumping site in Aomori/Iwate border

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



<SOLUTION 2> INSPECTION AT TOLLGATE

32 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

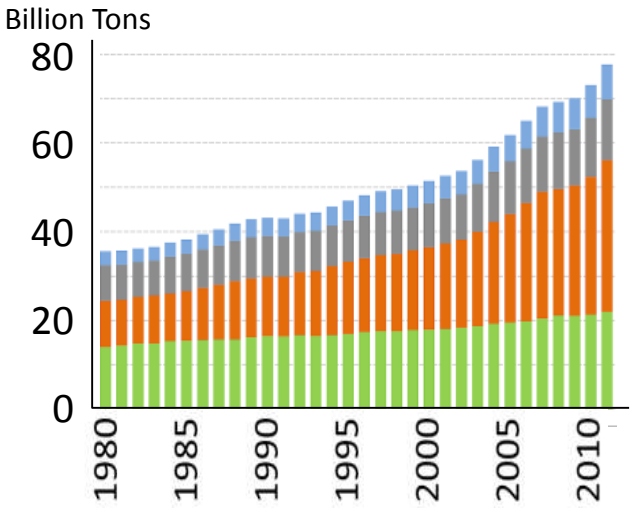
2-3 TMG's 5-year Plan

(FY2016-2020)

Increased Consumption of Resources and its Environmental Impact

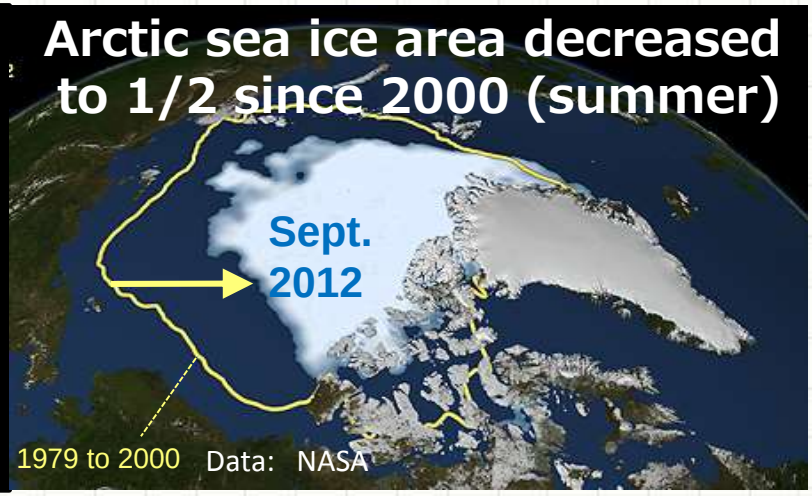
Resource-Consumption Increased Globally

Global Consumption of Resources 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

Global Trends in Sustainable Use of Resources

G7 Elmau Summit Leader's Declaration (June 2015)

Key items incorporated:

- Responsible supply chains
- Alliance for Resource Efficiency

UN Sustainable Development Goals (adopted in September 2015)

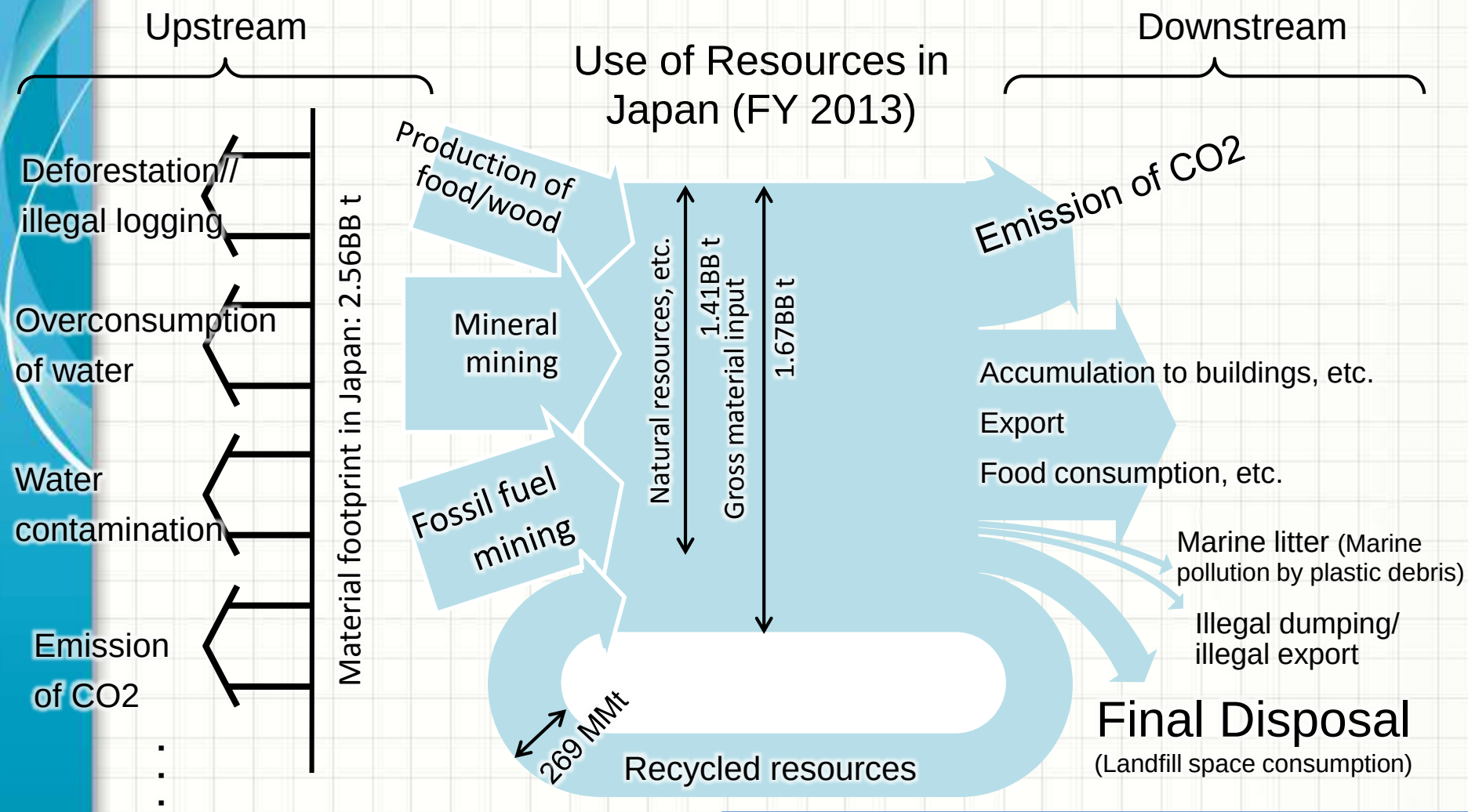
Goal 12: Ensure sustainable consumption and production patterns

- Sustainable management and effective use of natural resources
- Reduce food loss and waste
- Sustainable public procurement, etc.

Supply chain initiatives

- Responsible supply chain management, especially in terms of procurement behavior
- ISO 26000/ISO 20400

Environmental Impacts in the Upstream and Downstream sides of Resource Use



Data: UNEP (2015), Resource use in the Asia-Pacific - A booklet of infographics.
Tokyo Metropolitan input-output table, 2008
Tokyo Annual Report on Economic Statistics, 2012
Environmental White Paper, 2016

- **47.5%** of head offices in Japan located in Tokyo
- Tokyo's GDP accounts for almost **19.4%** of national GDP

Expected problems in near future

The coming of super-aging society and population decline

- Elderly people who need nursing cares or who live alone may have difficulties with appropriate waste sorting and emissions, and a lot of articles tend to be left after their passing away

Need to prepare disaster waste treatment system for the near-field earthquake

- Big earthquake or other disasters are expected to hit Tokyo in near future so that disaster disposal plan is needed based on recent experiences which helped municipality/other prefectures in recent disasters

Waste from Great East Japan Earthquake (Onagawa town temporary yard)

Oshima town (Tokyo) disaster waste (secondary temporary yard)

Basic Idea of the Plan

1. Tokyo's Resource Recycling and Waste Disposal Aims for 2030

(1) Converting to sustainable use of resources

- Improvement of resource efficiency
- Toward a society which use goods carefully for a long time
- Products of low-carbon, coexisting with nature and recycling-oriented are chosen positively
- cyclical use of resources accumulated in cities has greatly progressed

(2) Passing good urban environment to the next generation

- Prolong life of final disposal sites as long as possible
- Eliminating inappropriate disposal
- Establish optimal resource recycling and waste disposal systems, accounting for environmental load and social costs
- Swifter disposal of disaster waste

2. Partnership with Various Entities

Businesses, residents, NGOs, municipalities and foreign cities, etc.

Goals

1. Reduce resource loss
2. Spread sustainable procurement
3. Promote circular use and reduce final disposal volume
   - Recycling rate for MSW
     FY 2020: 27% FY 2030: 37%
   - Final disposal volume (total of MSW and industrial waste)
     FY 2020: 14% reduced from 2012 level
     FY 2030: 25% reduced from 2012 level
4. Promote proper, efficient disposal
5. Ensure disaster waste treatment system

KEY MEASURES

1: Reduction of Resource Loss

Reducing food loss*

*unsold food, leftover, or otherwise disposed of without being eaten

- **Food loss in Japan** is approx. **6MMt/y** nationally and approx. **300,000t/y in Tokyo**, despite few food manufacturers in the city
- Disposal volume of storage food for disaster is expected to increase, as they are replaced before the expire date.

Work together with businesses, NGOs/NPOs, and other groups to promote initiatives to have food consumed effectively in homes and stores before it spoils.

Change in lifestyle based on single-use materials

Toward consumption behavior which takes account of re-use and long-use

- Promoting re-use cups/dishes in big events in Tokyo
- Reducing using single-use plastic bags

2: Promotion of Eco-Materials Use and Spreading Sustainable Procurement

Minimizing environmental load and promoting sustainable resource use

Promoting use of green materials in construction

- Sustainable use of lumber
- Promoting use of recycled crushed stone, recycled aggregated concrete, improved soil from construction sludge, etc.

Promoting sustainable procurement

- SME's measures are indispensable
- Establishing sustainable procurement in the chance of Tokyo 2020

3: Promotion of Further Circular Use of Waste

Creating rules for recycling commercial waste

Plastic waste and mixed papers disposed from office buildings and commercial buildings can be recycled more

→ 3R rules which take account of cost, convenience for dischargers and actual situation of the site are needed

Toward optimizing circular use and waste management system

For small businesses, the much more sorting, the higher cost of collection and transportation of waste, the less recycling

→ More efficient venous distribution by applying private businesses' power maximum

4 : Appropriate Waste Treatment and Improving Waste Dischargers' Manners

- Appropriate waste sorting and emissions from households in the coming of super-aging society and population decline
- Promoting cleaning activities in main streets/shopping areas/sightseeing spots to prevent marine litter and beautification

5: Development of Sound and Reliable Venous Businesses

- Further PR of the Tokyo Super Eco Town Project (slide 61) and Certification system of Top-runner industrial waste disposal company (slide 63)

6: Countermeasures for Disaster Waste

- Formulate TMG disaster waste management plan
- Support municipalities to formulate their disaster waste plans
- Discuss to ensure wide-area disposal systems, cooperating with national government and related groups/organizations

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

Toward 2020, and further future

The Tokyo Organizing Committee of the Olympic and Paralympic Games is conducting the Tokyo 2020 Medal Project to manufacture the medals given at the Games from consumer electronics such as used mobile phones. As this project will be a stimulus to change people's thinking and create a more sustainable society, TMG has been cooperating with this project.

Dismantle and pick up gold, silver, and copper etc.

Recycle into 2020 medals

東京都食品ロス削減パートナーシップ会議
Multi-Stakeholder Partnership Meetings

The purpose of the meetings

1. Discuss solutions and foster collaborations that would contribute to SDGs' target to halve food waste and reduce food loss by 2030, with food industries, consumers and experts
2. Establish Tokyo-Style Food Waste Reduction Policy by 2020

東京都食品ロス削減パートナーシップ会議
Multi-Stakeholder Partnership Meetings

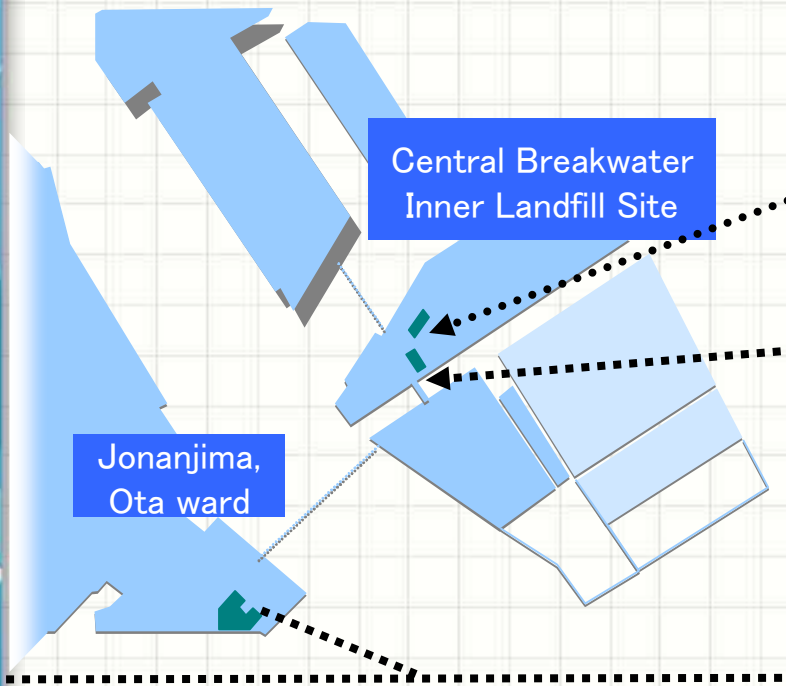
企業の本社機能の約5割が集積している東京

⇒フードチェーン全体に関わる事業者の方たちに、食品ロスの削減に向けた取組を求めていく必要。

食品製造業、卸売業、小売業、消費者団体及び有識者が一堂に会し、食品ロスの削減策を検討し、協働で取り組んでいく場として「東京都食品ロス削減パートナーシップ会議」を本年9月に設置し、議論。

The purpose of the meetings is to discuss solutions and foster collaborations that would contribute to SDGs' target to halve food waste and reduce food loss by 2030, with food industries, consumers and experts.

List of Recycling Facilities in Tokyo Super Eco Town



PCB Waste Treatment

Waste to Energy
(Waste Fuel Electric Power Generation Plant)

Waste to Energy
(Biogas Power Generation from Food Waste)

Construction and Demolition Waste

Debris and drilling mud

Buried waste
(buried before the establishment of waste mgt law)

E-Waste

Food Waste

Waste tile carpet

License System in

License/Facility	Types of Approval	Authority
Licensing waste disposal companies	General Waste Collectors and Transporters	Municipalities
	General Waste Disposal Operators	Municipalities
	Industrial Waste Collectors and Transporters	Prefectures
	Industrial Waste Disposal Operators	Prefectures
	Special Industrial Waste Collectors and Transporters	Prefectures
	Special Industrial Waste Disposal Operators	Prefectures
Approval of construction	General Waste Management Facilities	Prefectures
	Industrial Waste Management Facilities	Prefectures

Rules of waste disposal license

1. License GW or IW separately
2. License WC&T or WD separately
3. License by the authority
4. License by the type of IW
5. Some requirements for approval

19 waste management facilities are required for licenses.

e.g. Mud Dehydration facility (10m^3 / day or more)

Incineration facilities (200kg/hour or more)

Requirements of IW Licensing

Requirements based on the law by the type license

Common requirements

①Prevent IW from being scattered, flowing out and penetrating into the underground.

②Take appropriate measures so that any trouble does not occur because of a bad smell, the noise or vibration on the living environment conservation.

③Take appropriate measures not to cause any troubles in the living environment, in case of constructing facilities.