Integrated Solid Waste Management in Yokohama

Resources & Wastes Recycling Bureau,
City of Yokohama

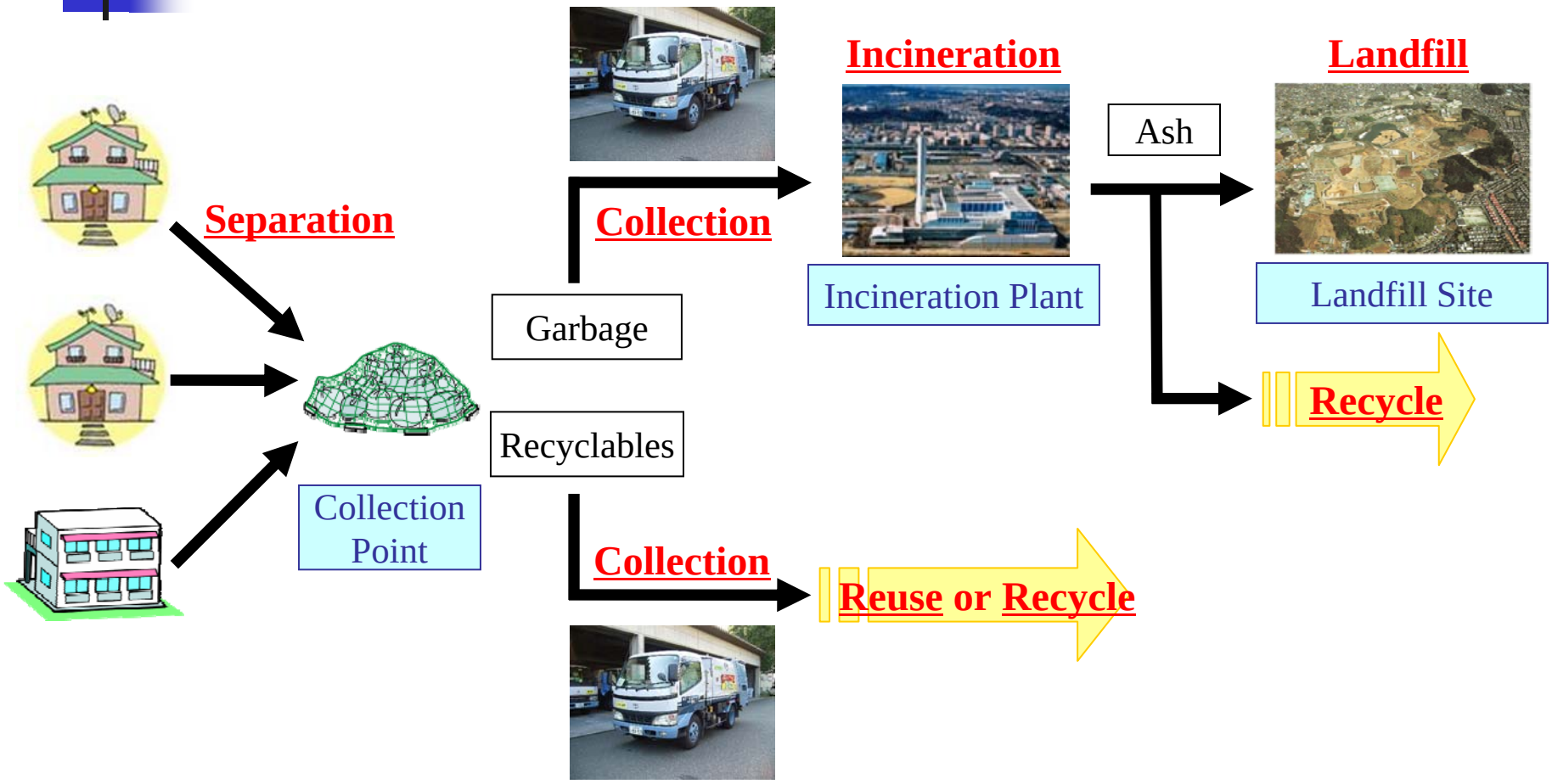
City of Yokohama Profile

Population	3,693,200 (as of Sep.1, 2011)
Households	1,594,320 (as of Sep.1, 2011)
Frequency of garbage collection	Household waste (Combustible waste), Dry-cell batteries, Noncombustible waste, Spray cans : Twice a week Cans, Bottles, PET bottles, Small metal items, Plastic containers and packaging : Once a week Used paper, Used cloth : Twice a month Bulky waste : Application required
Collection points	About 66,000 sites



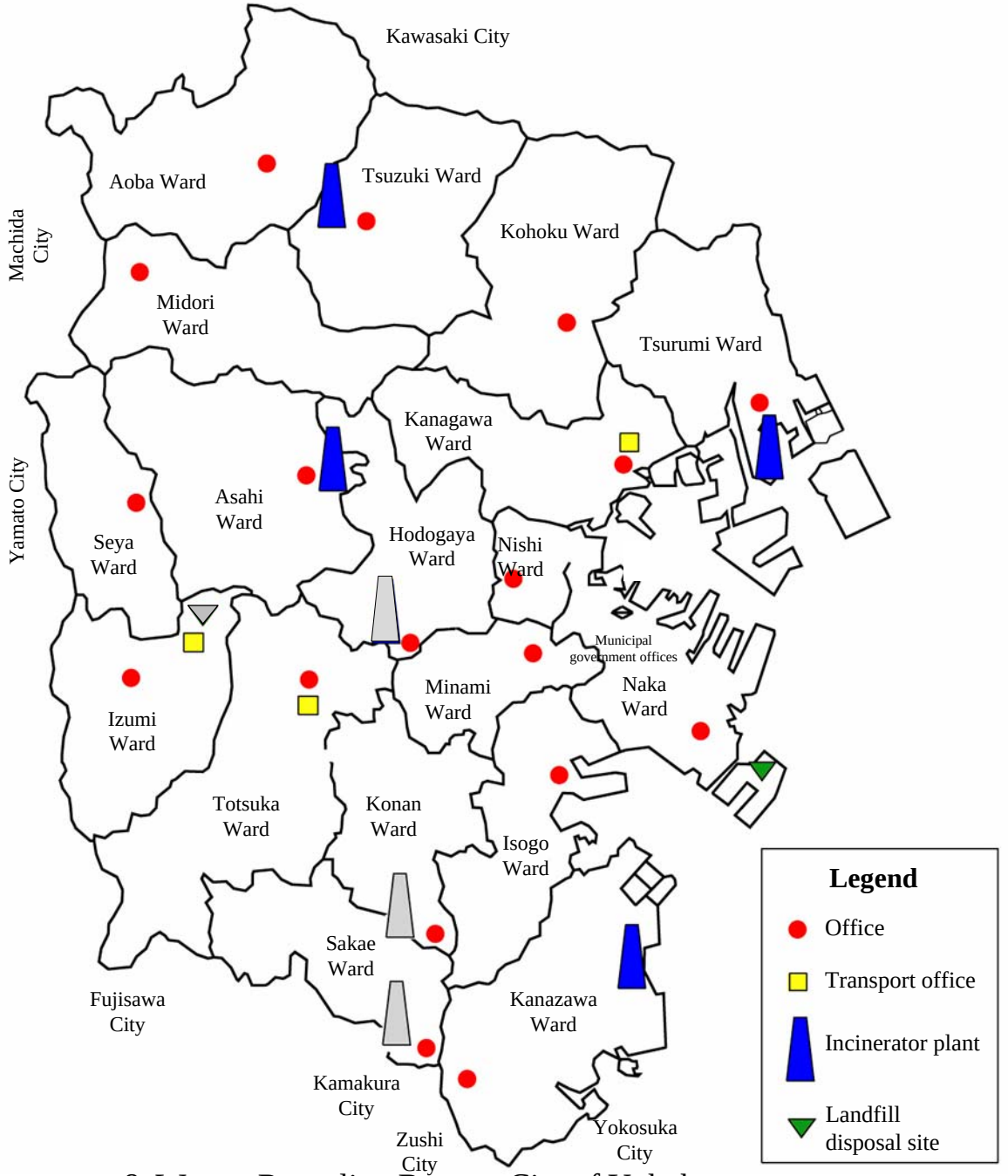



Flow of garbage and recyclables treatment

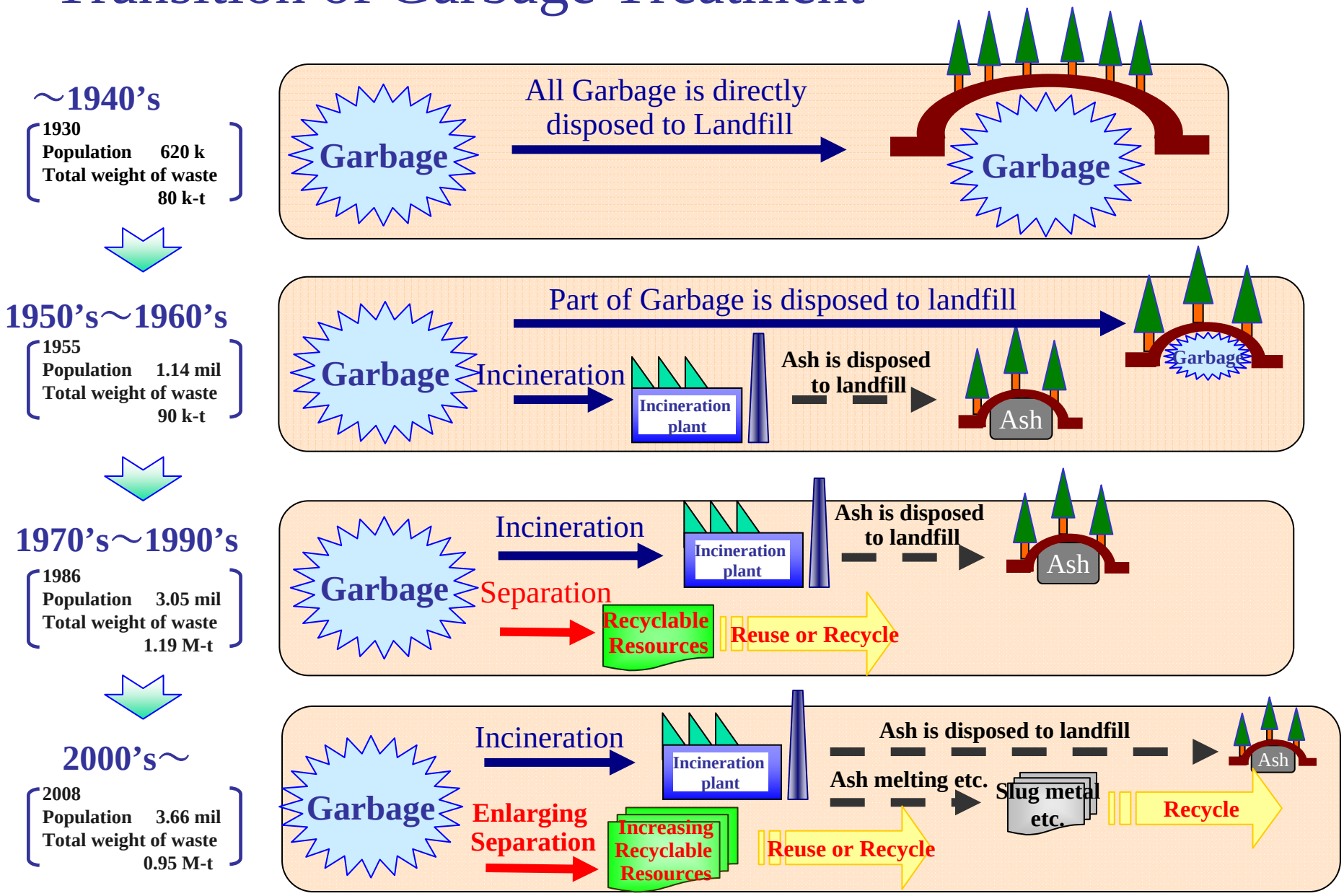


Facilities layout

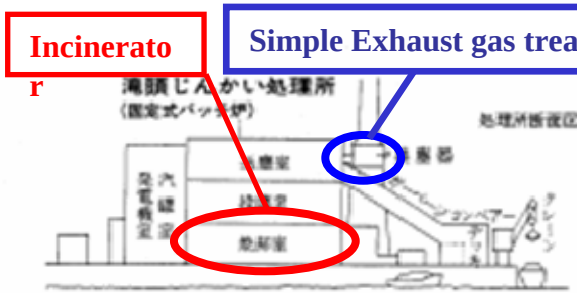
- Collection offices
  18 in the city
  (1 in each ward)
- Transport offices
  3 in the city
- Incineration plants
  4 in the city
  (2 plants: closed
  1 plants: suspended)
- Landfill sites
  1 in the city
  (1 site: closed)



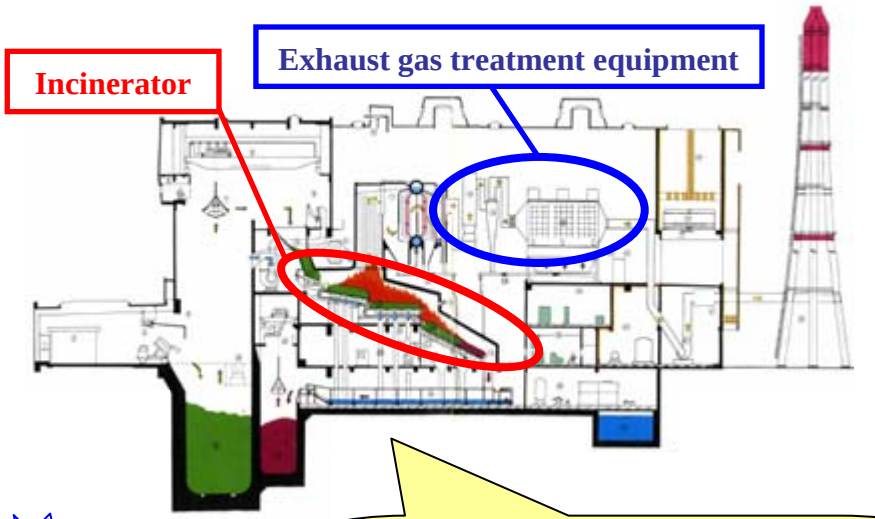
Transition of Garbage Treatment



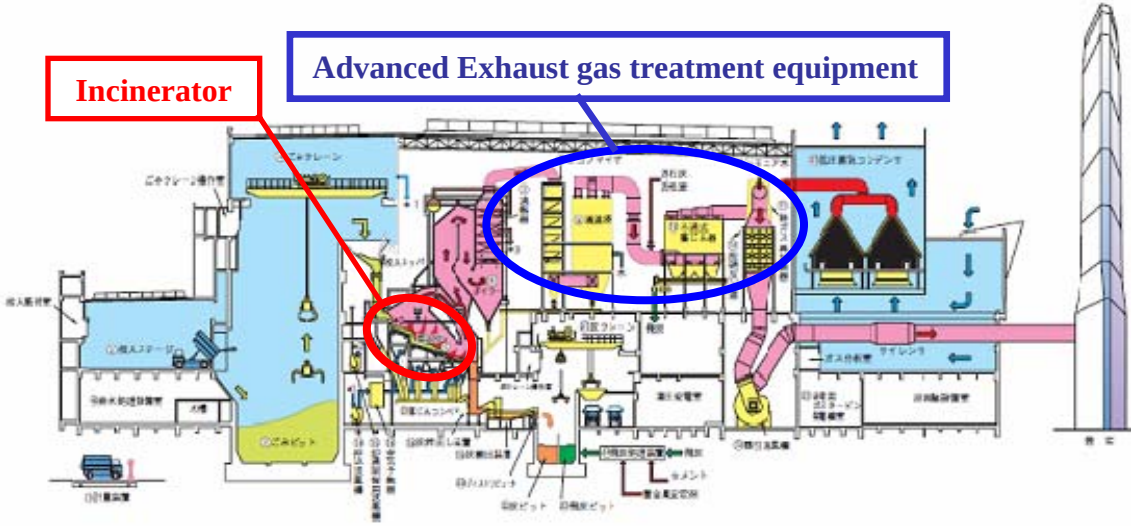
Transition of System of Incineration



1929, Takigashira plant
- Batch furnace (fixed grate)
- Simple exhaust gas treatment equipment for only fly ash



1973, Asahi plant
- Continuous mechanized furnace
- Exhaust gas treatment equipment



2001, Kanazawa plant
- Continuous mechanized furnace
- Sophisticated e Exhaust gas treatment equipment
- Bottom ash melting facilities
- High-efficiency power generation system

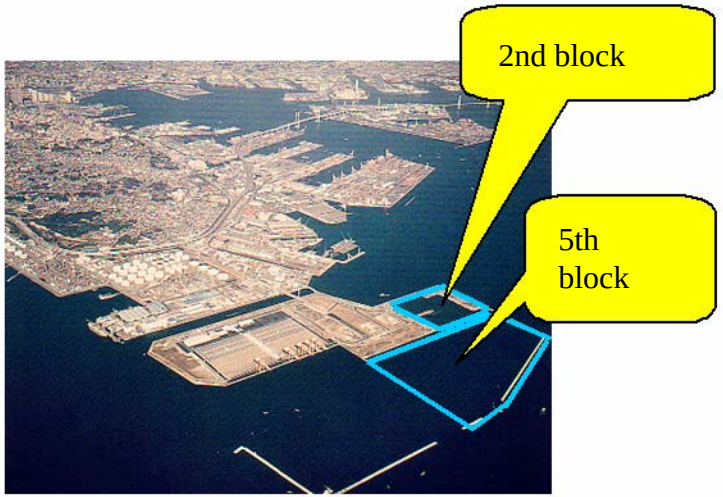
Incineration Plants and Landfill Sites

- Incineration Plants

	Tsurumi	Asahi	Kanazawa	Tsuzuki
Started in	Apr. 1995	Apr. 1999	Apr. 2001	Apr. 1984
Treatment capacity	1,200 t/day	540 t/day	1,200 t/day	1,200 t/day

- Landfill Sites

Shinmeidai Disposal Site (~Mar. 2011)



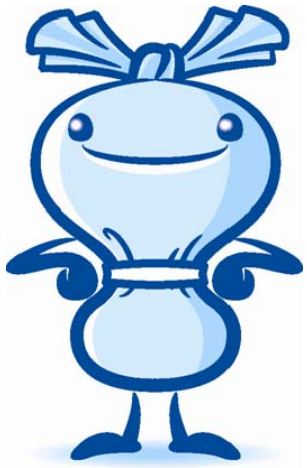
Minami-Honmoku Final Disposal Site

Effective Use of Thermal Energy

A steam turbine generator is installed to supply electric power not only to the incineration plant itself , but also to adjacent facilities.
Furthermore , electric power is sold to the electric company.
The revenue generated through the sale of power is about 2.3 billion yen.

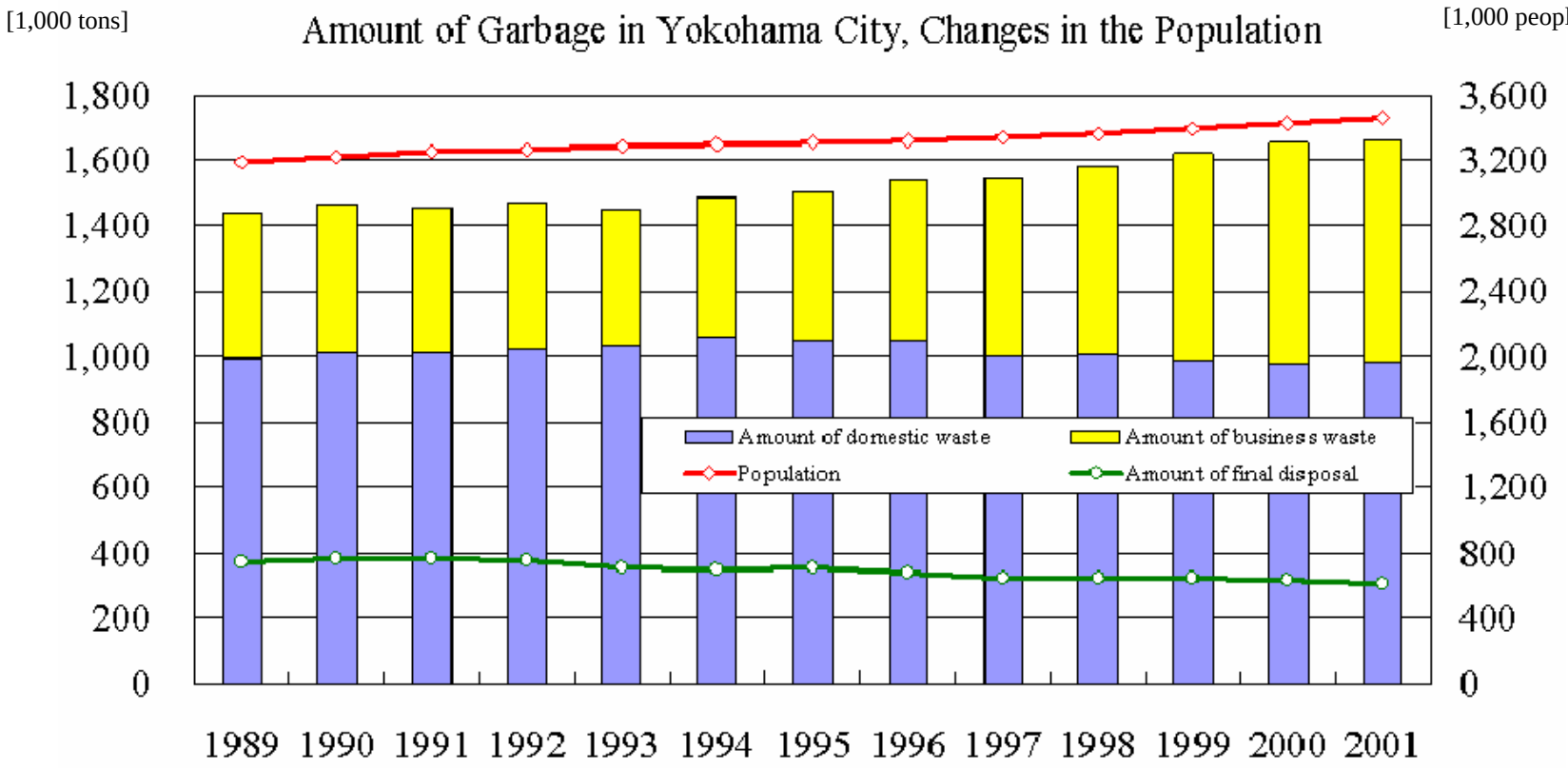
“Yokohama G30”

Yokohama municipal solid waste management master plan (FY2002-FY2010)



Background for the Creation of the Yokohama G30 Plan (1)

Ever-Increasing Garbage



Background for the Creation of the Yokohama G30 Plan (2)

Continuation of society will be difficult if no action is taken to solve various environmental problems...

In order to hand over the rich natural environment to our children

Jan. 2003

“Yokohama G30 Plan” was created

Basic Principles of the Yokohama G30 Plan

Citizens, companies and the administration work together in promoting the 3Rs for waste, with the aim of realizing a “sound material-cycle society” where the consumption of resources and energy is reduced as well as reducing the environmental impact.

Roles of Citizens, Companies the Administration

Citizens	Changing to an environmentally friendly lifestyle, rigorous sorting of garbage, etc.
Companies	Design and production of products which reduce the emission of waste, collection and recycling of used products, etc.
Administration	Creation of systems for 3Rs, raising the awareness of people, provision and exchange of information, etc.

Efforts to Reduce Household Waste
- Increase in Items for Sorted Collection -

<Past: 5 types, 7 items>

- Household waste (Combustible waste)
- Bulky waste
- Cans, Bottles, PET bottles
- Small metal items
- Used dry-cell batteries

<Present: 10 types, 15 items>

indicates the new items to be sorted for collection

- Household waste (Combustible waste)
- Bulky waste
- Cans, Bottles, PET bottles
- Small metal items
- Used dry-cell batteries
- Plastic containers and packaging
- Noncombustible waste
- Spray cans
- Used cloth
- Used paper
  - Newspaper
  - Magazines, other paper
  - Cardboard
  - Paper cartons

Publicity and explanation to the residents

- **Separation briefing** : About 11,000 times (FY2004 & 2005)
- **Educational campaign in front of train stations** :
  About 600 times (FY2004 & 2005)
- **Early morning educational instruction at collection point** :
  About 3,300 times (FY2004 & 2005)
- **Garbage left behind due to non-separation** : About 10,900 times (FY2009)

Separation briefing

Educational campaign in front of the stations

Early morning educational instruction

Inspection of Collected Garbage at Plants

- The inspection of collected waste at incineration plants became stricter from Dec. 2003.
- A self-propelled waste inspection device was introduced at all plants.
- If the collected garbage contains a large volume of inappropriate waste and recyclable waste such as used paper, the garbage collection company is instructed to take it back.

Inspection of incoming waste

Waste inspection device

Rate of collection trucks inspected

FY2009	85% (164,095 trucks)
FY2010	89% (176,847 trucks)

Promoting Environment Study

◆ **G30 Delivery lecture** : Visit elementary and Junior High schools

●Explain about the situation with the amount of garbage and processing system

●Demonstration of collection work

◆ **Incineration plant facility tour** : About 38,000 participants (FY2009)

Incineration plant facility tour

G30 Delivery lecture

G30 Delivery lecture

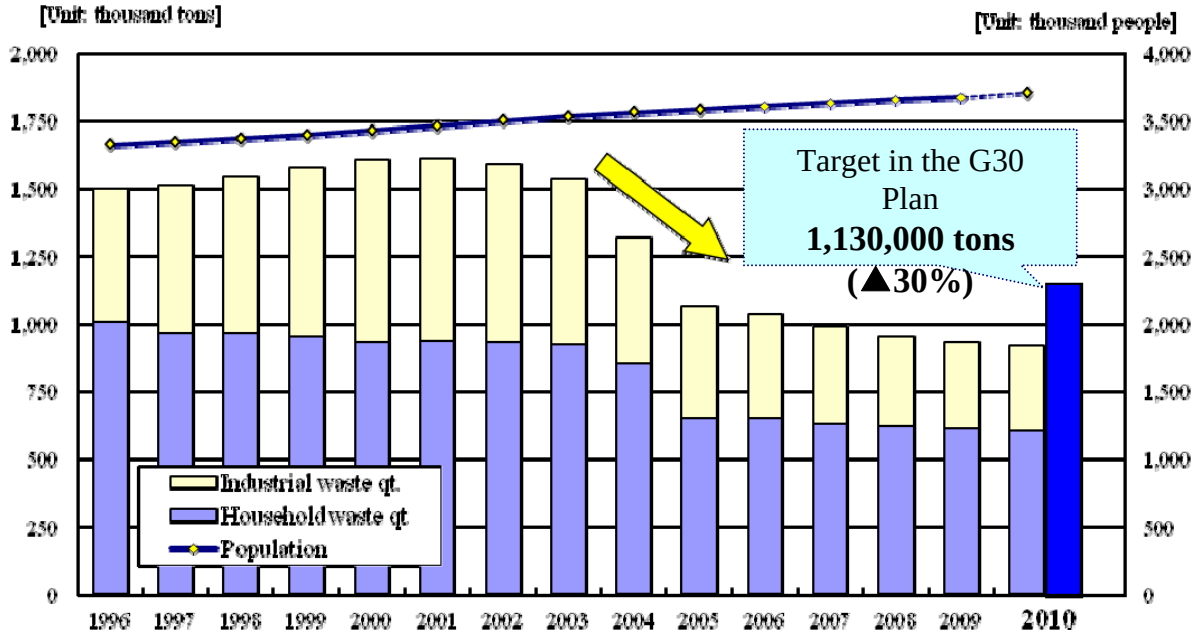
Service Improvement for Citizens

- **“Fureai” Collection** : with the help of volunteers from the local area, we offer assistance to the elderly and persons with disabilities by carrying trash from their homes to the collection locations.
- **Narrow road collection** : Utilize pickup trucks to collect refuse from areas where the regular garbage collectors cannot enter.

“Fureai” collection

Pickup truck used for narrow road collection

Movements and Targets of Amount of Waste



(Unit)[Waste quantity: thousand ton, Population: thousand people]

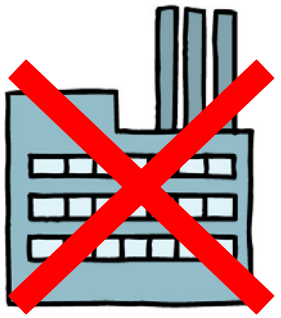
Fiscal year	2001	2008		2009		2010		2010 (goal) G30 Plan	
			compared to 2001		compared to 2001		compared to 2001		compared to 2001
Waste qt.	1,609	949	▲ 41 %	930	▲ 42 %	915	▲ 43 %	1,130	▲ 30 %
Household waste	935	618	▲ 34 %	611	▲ 35 %	603	▲ 35 %		
Industrial waste	674	331	▲ 51 %	318	▲ 53 %	312	▲ 54 %		
Population	3,462	3,651	5 %	3,672	6 %	3,707	7 %	3,707	7 %

“Effects of G30”
(1) Incineration plants - closed and suspended -

- Two incineration plants were closed down and one was suspended due to a significant reduction in the amount of garbage.

[Incineration plant]

Sakae (1,500t/day)	: Oct. 2005 closed
Konan (900t/day)	: Nov. 2006 closed
Hodogaya (1,200t/day)	: Apr. 2010 suspended



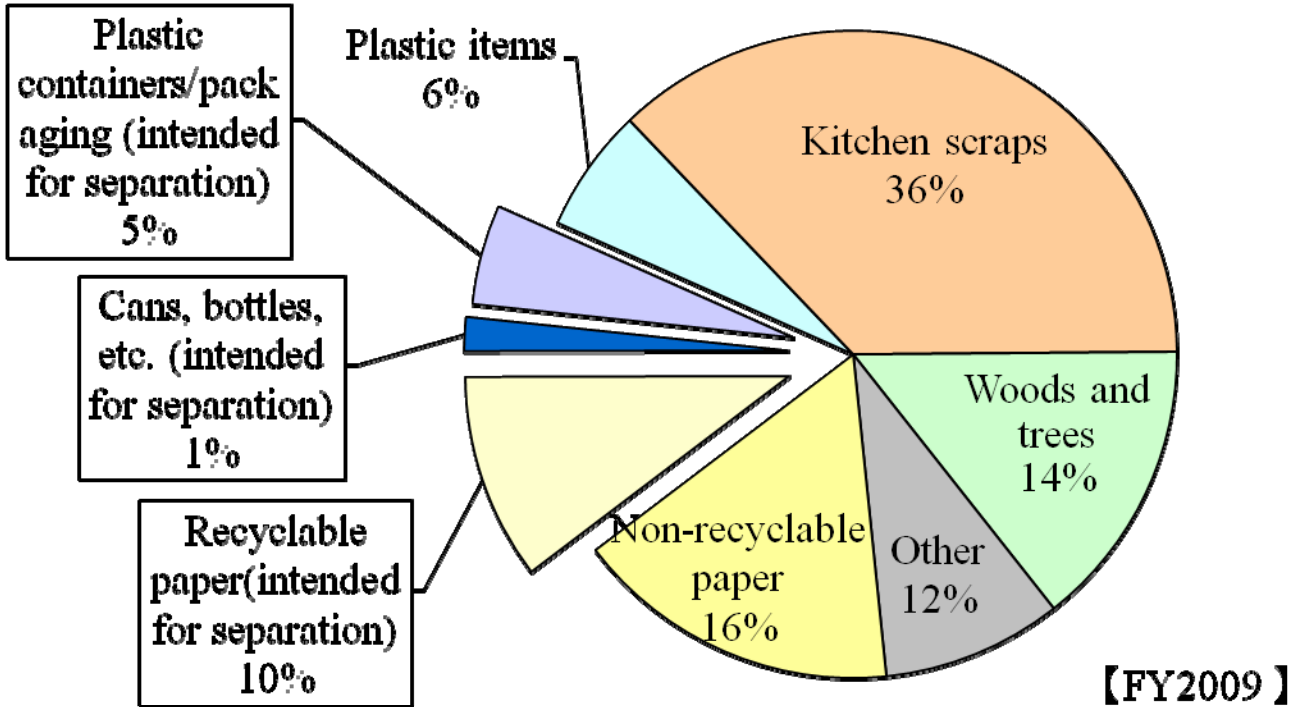
“Effects of G30”
(2) Reduction of Environmental Impact

- CO_2 emissions when treating garbage were reduced by significantly reducing the amount of garbage.

- CO_2 emissions in FY 2009 were reduced by 900,000 tons when compared to FY 2001.
  (originally calculated by City of Yokohama with LCA method.)

This is equivalent to the CO_2 absorbed by 64 million Japanese cedars in one year.

Household Waste (Combustible Waste) Composition



“Combustible waste” still contains recyclable paper or plastic containers that can be separated out.

Beyond the G30 Plan

“Yokohama 3R Dream” (s l i m)

Yokohama municipal solid waste management master plan (FY2010-FY2025)

G30 to Yokohama 3R Dream Plan (slim)

◆G30 Plan (Jan. 2003)

We have promoted reduction of the amount of garbage by the separation and recycling of garbage

◆Yokohama 3R Dream Plan (Jan. 2011)

While continuing the separation and recycling of garbage, we plan

1. to reduce garbage (waste generation control)
2. to deal with global warming and to reduce GHG emissions
3. to pursue safe, secure, and stable garbage processing

What is “3R Dream”?

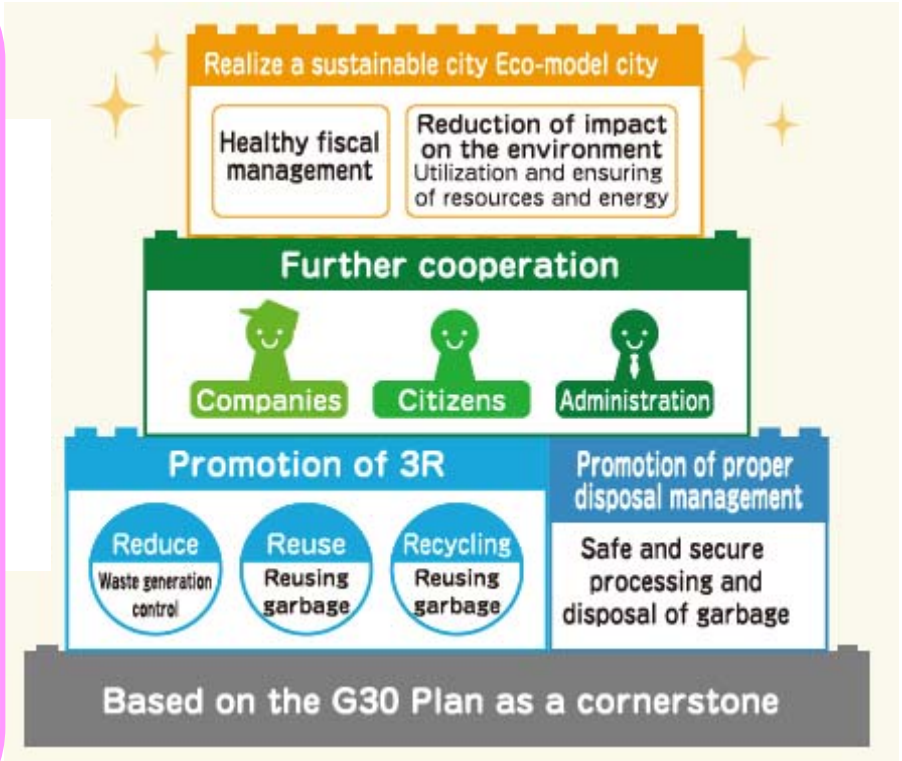
“3R Dream” ⇒ “3R Dream Plan” aims to reduce garbage and its impact on the environment by “3R”, and ensure the environment’s richness to future generation.
And so we will establish a society comprising of citizens and companies where children have “Dreams” for future.

“3R” ⇒ Practice the 3Rs

Reduce : Reduce garbage itself
Reuse : Use any goods as long as we can
Recycling : Separate and use articles as recyclables

Basic principle of 3R Dream Plan

We will endeavor to effectively use limited resources and energy as well as to promote 3R based on further cooperation among the citizen, companies, and administration by conducting proper disposal management, and establish a sustainable and Eco-Model City by combining reduction in the impact on the environment and healthy fiscal management.



Targets of 3R Dream Plan

Scheduled Period : FY2010 to FY2025

◆Further challenge for 3R

We will reduce total generation of garbage (total amount of garbage and recyclables)
by more than 3% by FY2013 (as compared to the generation for FY 2009)
and by **more than 10% by FY2025** (as compared to the generation for FY 2009)

◆Tackle global warming starting from reduction garbage

We will reduce GHG emissions from garbage processing
by more than 10% by FY2013 (as compared to the emissions for FY 2009)
and by **more than 50% by FY2025** (as compared to the emissions for FY 2009)

◆Pursuing safe, secure, and stable garbage processing

Reduce

Match of Reduce ～Yokohama R Square～

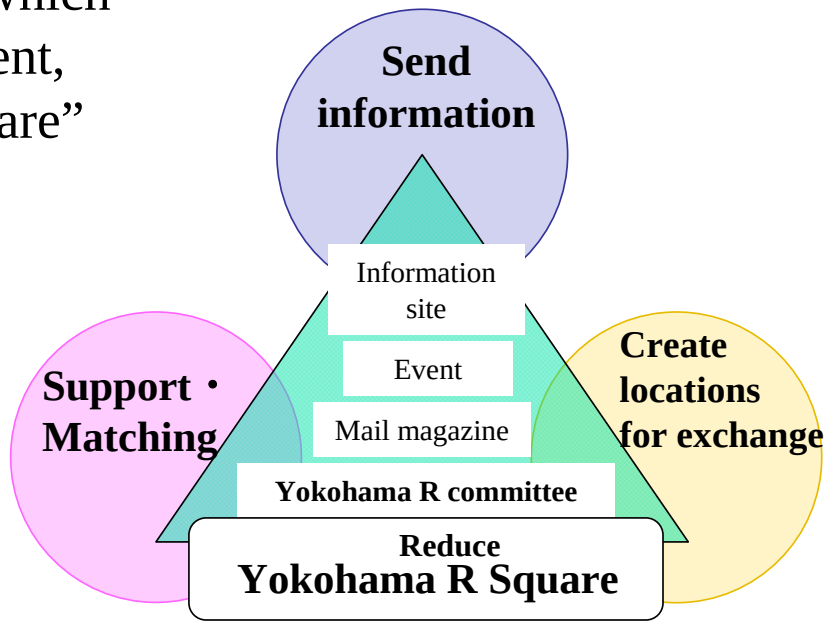
Promoting “Reduce” efforts

In order to promote the “Reduce” effort, which is the measure most kind to the environment, we introduced “Yokohama R(reduce) square” in Oct. 2010.

Reduce

Yokohama R Committee

Committee made up of residents, businesses and the municipal government to support the actualization of new efforts by providing information, publicity and the introduction of partners.



【Schematic image】

Striving for the further reduction and recycling of waste.

END