

*INTRODUCTION*

# Past and Present Solid Waste Management in Japan

1. Collection
2. Incineration
3. Landfill
4. Source separation

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Scavengers or  
Waste pickers



Open Dump

India



Cambodia



Phillippine



China



## Environment in Japan, not long time ago

(東京都環境局資料)



1971 Kiteflying



1973 Fishing at Tamagawa-  
river with white bubble



1972 Chiyoda-ku



1970 River covered  
with waste

## Solid waste collection in 1950s



第1-1 ごみ収集風景

自動車が入り込んでもパイクを使った手作業はなくならなかった。

ごみ箱からごみを掻き  
出し、車に積み込み、  
足で踏みならす。

# Kunitachi-City, Tokyo in 1958



People bring waste to the cart, which ring a bell

<http://history.kunitachi.jp.com/anokoro/598>

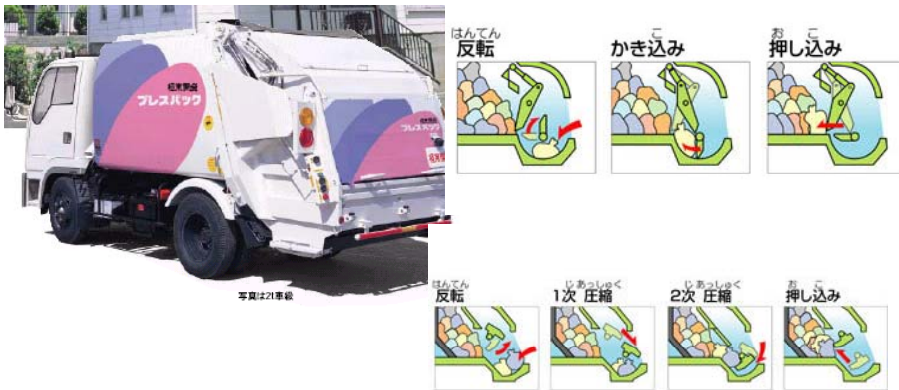
# Introduce mechanical truck in 1960s



第1-3 ロードバッカー車の試験的導入

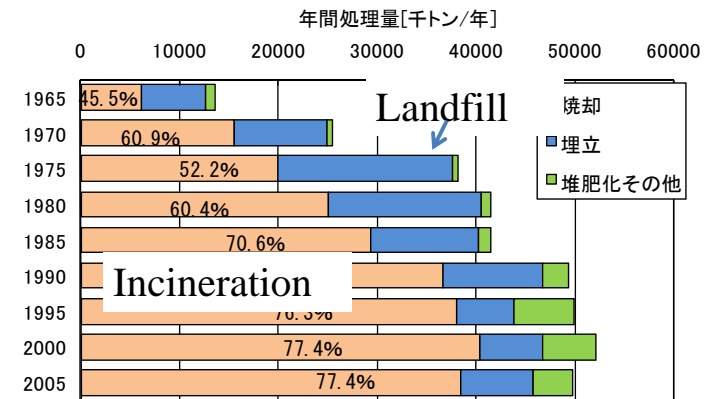
東京都清掃事業百年史p.390

# Mechanical collection vehicle



極東開発工業パンフレット

# Increase of MSW and Incineration rate



Incineration was given priority as effective technology to control epidemic disease in 1900

## Why Most Countries Use Landfill?

### Incineration

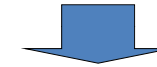
Incineration was originally developed in the West.  
In England, 300 incinerators were constructed  
for 20 years since 1981

- 1) High treatment **cost**  
(4~5times higher than landfilling)
- 2) Discharge of Air **Pollutants**  
⇒ High Technology  
⇒ Expensive construction cost

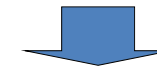
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## Why Incineration in JAPAN?

- Incineration was selected as national strategy of waste management in 1900
- To control epidemic diseases.(cholera and pest.)



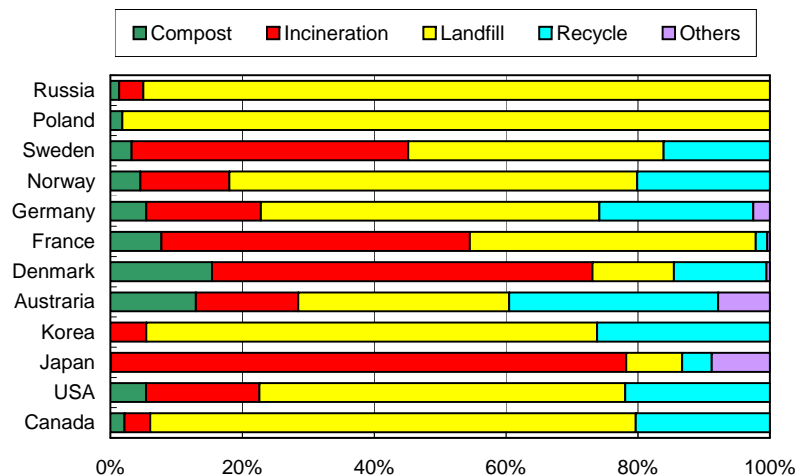
- ❑ Subsidy program initiated in 1963.
- ❑ Tax revenues distributed to local governments



Construction of expensive facilities is possible

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## Waste Disposal Method in the World



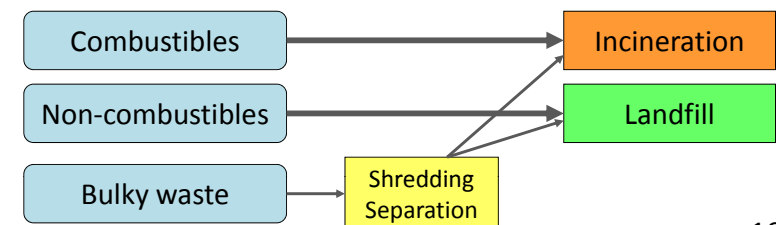
日本環境衛生センター「Fact Book 2000」より作成

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## Source separation in Japan

To make incineration easier

- ◆ Remove food waste (Not common)
- ◆ Separate plastics to reduce HCl formation
- ◆ Separate incombustible waste



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## Composition of Household waste (Kyoto)

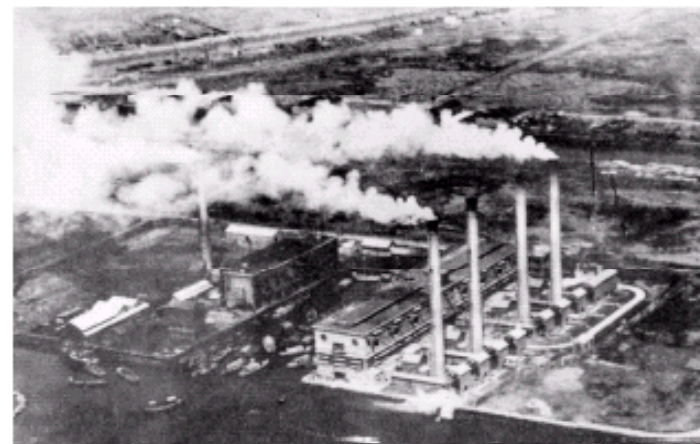
Year	1951	1961	1971	1981	1999
Paper	7	21	28	26	33
Textiles	2	2	6	3	3
Wood	11	8	2	1	1
Rubber	1	2	0	1	1
Plastics	0	1	11	14	15
Food waste	21	20	33	44	39
Other combustil	3	1	0	2	1
Metals	1	2	4	4	3
Dirt, ceramics	53	40	7	2	2
Glass	1	3	10	5	3



Economic  
Growth Era

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## Incinerator in Tokyo (1933)



第3-3 深川塵芥処理工場

左の小さい煙突が第一工場、右奥2本が第二工場 東京都清掃事業百年史p.457

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## Fukagawa Incinerator



景 全 場 工 廠

第一工場  
昭和4年竣工  
131トン/10時間  
建設費 488,619円

第二、三工場  
昭和8年竣工  
675トン/10時間  
建設費 679,771円

(p.490~491)

かまど式焼却炉と呼ばれていた

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## MSW Incinerator in 2003 (Sapporo)



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# Inside the incinerator



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# Landfill in Japan, in the 1950s



第6-1 8号地埋立場のゴミ搬送状況 (昭和25~27年頃)



第6-4 空からみた夢の島 (昭和40年)



第6-3 夢の島 (14号地) 埋立場埋立状況 (昭和32年頃)

Open burning was common.

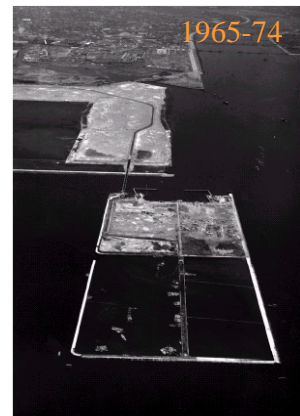
埋立期間 8号地 昭和2~37年  
14号地 昭和32~41年

(東京都清掃事業百年史pp.623~626)

# In the 1960s



第6-8 15号地埋立処理場埋立状況



第6-7 15号地埋立処理場建設状況 第2期工事 (昭和42年4月)

15号埋立地 埋立期間 昭和40~49年

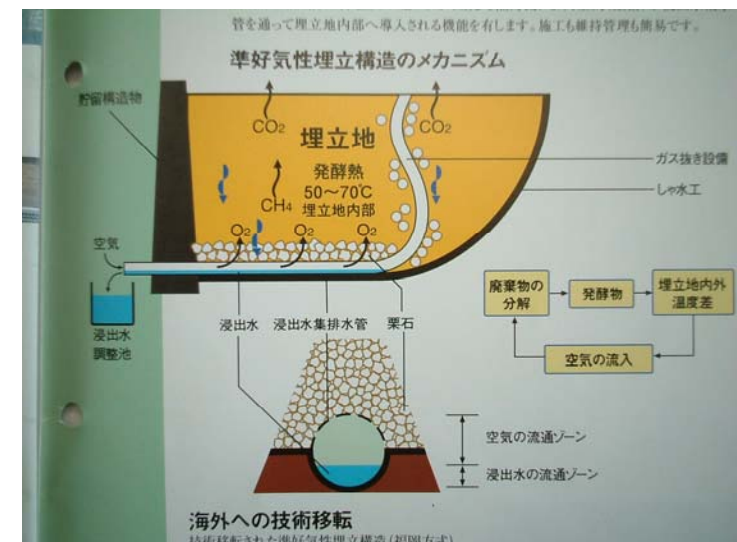
このあと

中央防波堤内側埋立地 昭和48~61年

〃 外側埋立処分場 昭和52~

(東京都清掃事業百年史pp.631~633) 23

# Semi-aerobic



海外への技術移転

技術移転された準好気性埋立構造 (福岡方式)

(福岡市環境局施設概要より)

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## Modern sanitary landfill (Nakata landfill, Fukuoka 1996-)



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## History of Recyclables Collection by municipality in Japan

1975 Numazu, Shizuoka

Steel & aluminum can, Glass bottles, Waste paper  
Famous Catchphrase

“Waste if mixed, Resource if separated“

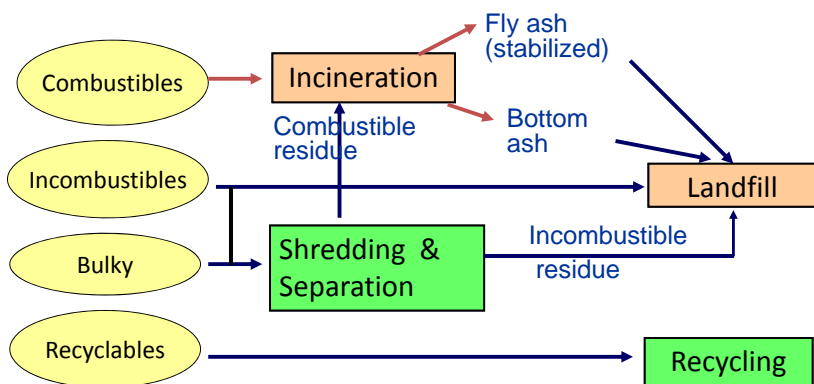
1978 **Advanced source separation**, Zentsuji, Kagawa

Waste glass bottles, Reusable glass bottles, Metals,  
Steel & aluminum can, Waste papers, Textiles

Collection on a regular basis, once a month

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## Typical flow of MSW management until late 1990s



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## Recycling Law since late 1990s

Package waste Recycling Law (1997) Waste Reduction

WEEE Recycling Law (1998)  
(Electric and Electrical Equipment)

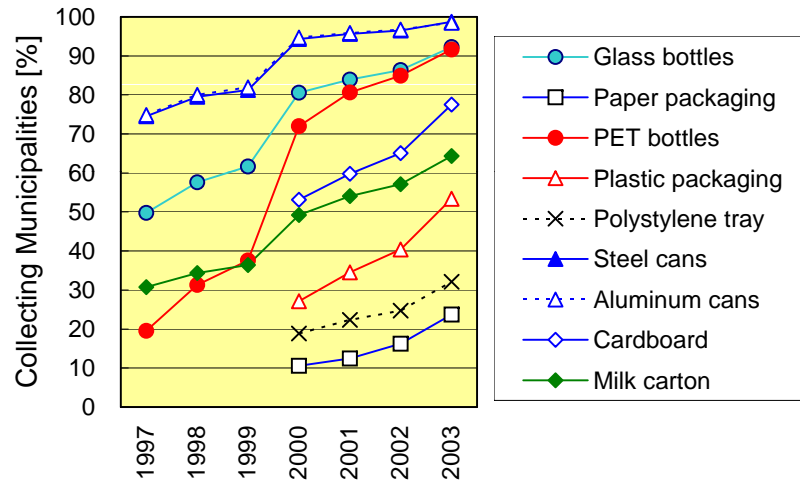
ELV Recycling Law (2002)  
(End of Vehicle: automobile)

Small WEEE Recycling Law (2014)

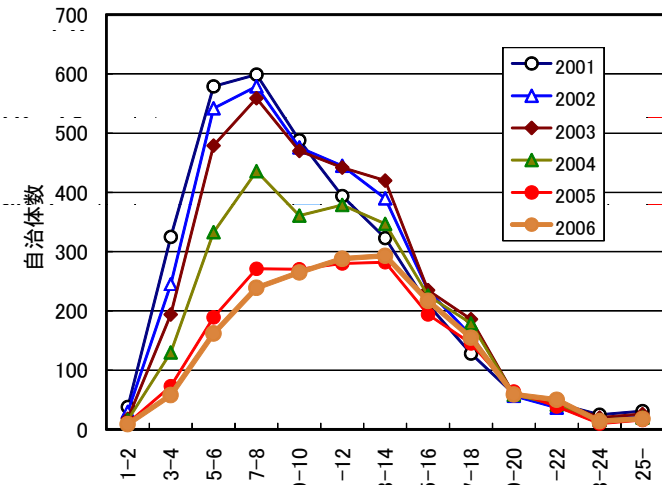
Resource Recovery

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## Collection by Local Gov.



## Number of source separation



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## Separate Collection of Waste (into 21 categories, Minamata, Kyushu)

(started from 1993)

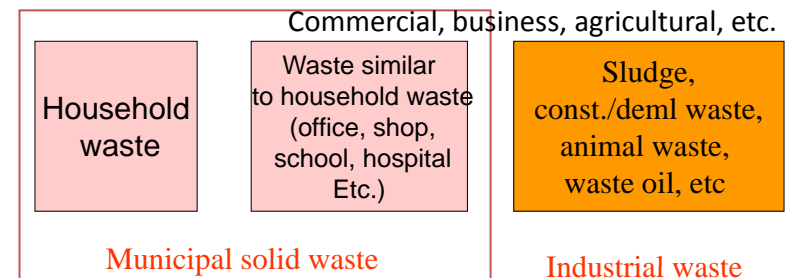
Bottles(Returnable, clear, blue, brown, green, black)  
 Plastics; Steel cans; Aluminum cans; Cooking pans;  
 PET bottles; Newspaper; Magazines; Cardboard;  
 Textiles; Bulky waste; fluorescent lamp ; Batteries;  
 Combustibles; Food waste; Waste to be landfilled



写真: 水俣市ホームページ  
<http://www.minamatacity.jp/kankyout/html/main/gomi23.htm>より)

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## Waste category by SWM law



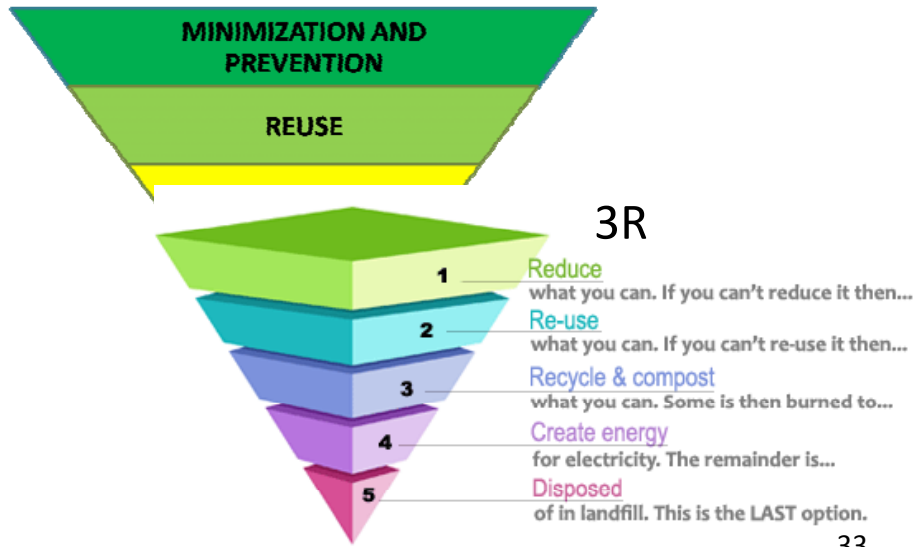
↓  
 Solid waste management facility operated by  
**Municipalities**

↓  
 Solid waste management facility operated by  
 waste management companies

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# Waste Hierarchy



# Integrated Strategy toward Sustainable Society

