

Advantages of WtE in the Japanese Experience

2022 WtERT Asia Webinar I: Benefits of Waste-to-Energy
and Its Promotion

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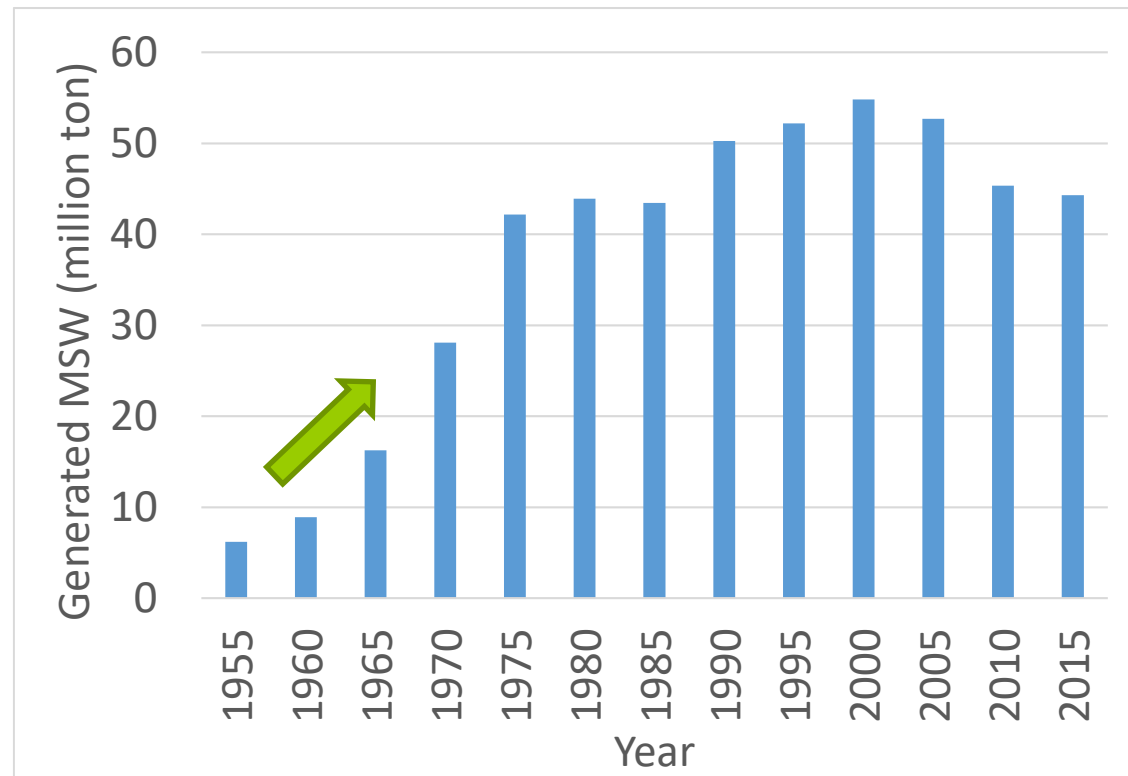
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WtE facilities can provide various values in a local area

Values	Content
Hygienic treatment/ volume reduction	<ul style="list-style-type: none"> • Basic roles • Re-evaluation in the pandemic of COVID-19
Resource recovery	<ul style="list-style-type: none"> • Use of thermal treatment residues
Energy recovery and supply	<ul style="list-style-type: none"> • Electric supply • Heat supply
Disaster prevention base	<ul style="list-style-type: none"> • Disaster waste treatment • Active use of resilient facilities
Treatment of other wastes in a local area	<ul style="list-style-type: none"> • Co-treatment of MSW with sewage sludge and other biomass wastes • Use of plastic waste
Contribution of local economy	<ul style="list-style-type: none"> • Job creation • Use of local businesses
Environmental Education	<ul style="list-style-type: none"> • Environmental Education • Environmental Study

Volume reduction was urgent.

- At the beginning of the 1960s, **the high economic growth** resulted in **a large increase** in **the amount of waste generated**.
- Drastic reduction of MSW is possible and good for limited landfilling.

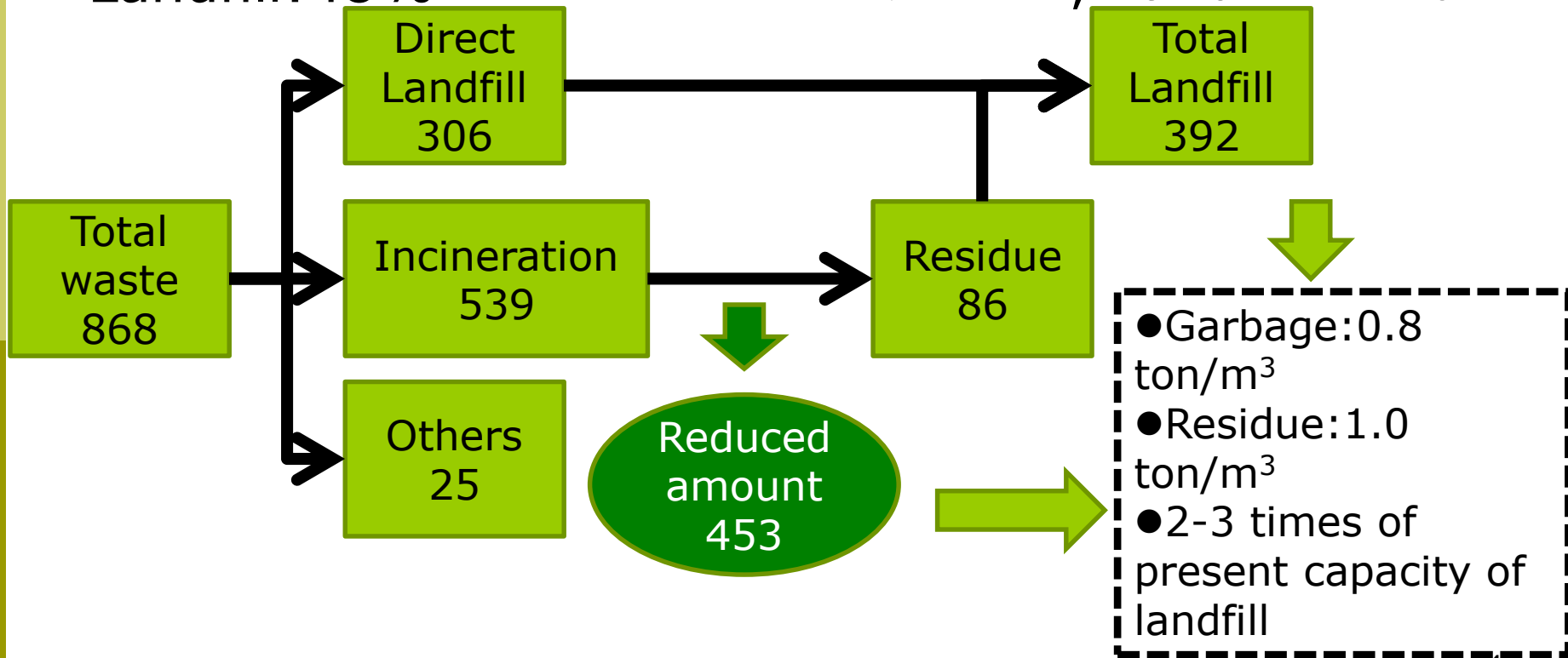


Source: MOE Japan

Volume Reduction

- 1965
- Incineration:46%,
Landfill:48%

- 1989
- Incineration:74%
, Landfill:22%



(million ton)

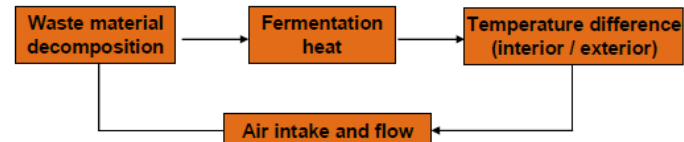
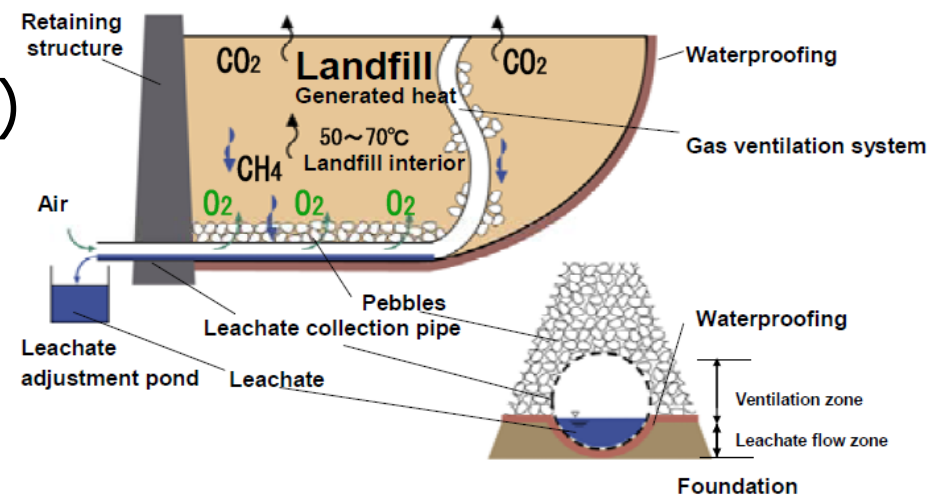
When all of the MSW were directly landfilled...

- Water content of MSW: 50%
- 70% of the weight in dried condition: biodegradable organic waste
- The emission factor of CH_4 by **semi-aerobic** landfill: 70kg- CH_4 /t-DB

(anaerobic: 140kg- CH_4 /t-DB)

● 943 thousand tons ($\times 21$) as CH_4

● **19.8** million tons of CO_2 are emitted > **15.4** million tons from MSWI in 2005



Incineration Plant

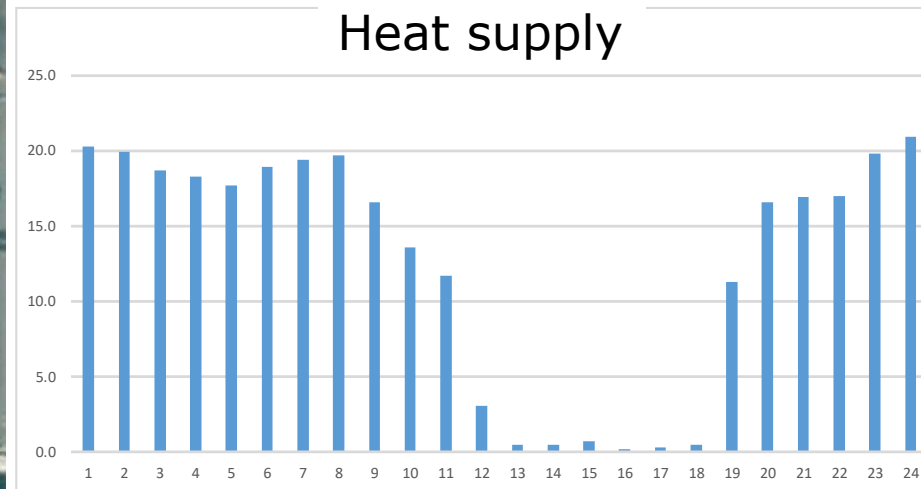
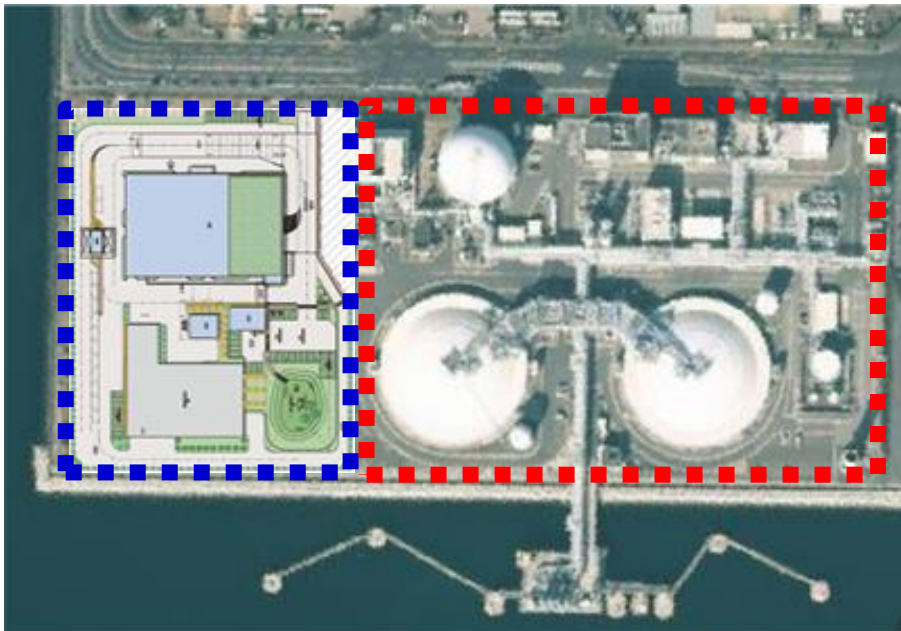
Scale : 150ton/day(75t/day × 2 lines)

Furnace : Fluidized bed type (gasification combustion)

Steam condition : 6MPa × 450°C (> 4MPa × 400°C)

Heat use : Electricity generation by steam turbine :3,140kW
(power generation efficiency:21.6%)

Heat supply: 20GJ/h from exhaust heat from steam turbine



Source: JEFMA, 2020

CO₂ Emission Reduction



Reduction by heat supply
5,400t/year



Reduction by power generation
4,300t/year

Total 9,700t/year

- Equivalent to the annual emission from 1,800 households
- More than expected reduction in industries in this city (4,429t/year)

Annual revenue of electricity and heat supply

Items	Revenue (*1000 yen)	Remark
Power	54,887	Unit: 9 yen/kWh、total:6,000,000kWh
Heat	27,090	Unit: 350yen/GJ、total: 77,400GJ
Total	81,977	

Imabari Clean center (Imabari Model)

-Connection of citizens, area and generation by security/safety-

■ Safety and stable Treatment of waste

■ Protection of the local environment and familiar with citizens

■ Environmental awareness, study and Disseminating information



Normal period

- Waste treatment
- Citizen's activity
- Environmental awareness
- Supply of electricity



At the time of disaster

- Continuation of waste treatment
- Operation of shelter
- Disaster waste treatment
- Supply of electricity

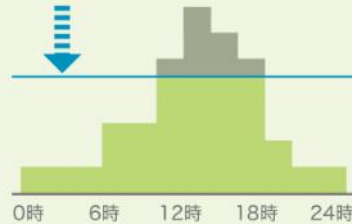


Phase **free** concept

Normal



Citizen's activity



Peak cut of electricity purchase



Support of event



Business use vehicle

Large training room

Normal & emergency generator

いつも

(平常時)

NPO

Electric vehicle

もしも

(災害時)



Shelter



Electric supply during power failure



Support of shelter operation



Mobile power source

Emergency