

# Potential Challenges for Proper Waste Management

## - Comparative study of municipal and industrial solid waste in Thailand-

January 2020



**JFE Engineering Corporation**



**JFE**

**JFE Holdings, Inc.**

**Japan Marine United**



**JFE Engineering**

Net Sales(million JPY)

**485,815**



**JFE Steel**

Net Sales(million JPY)

**2,830,649**



**JFE Shoji Trade**

Net Sales(million JPY)

**1,125,861**



(FY2018)



# Ring Road Bridge, Bangkok



[Location] Bangkok to Samutprakarn, Thailand  
[Project Owner] Ministry of Transport, Thailand





Waste-to-Energy



Biomass Power Plant



JFE's Technologies to Support Sustainable Cities and Communities



Sewage Treatment



Waste Heat Recovery









Photo : Takahashi





**CH<sub>4</sub>**

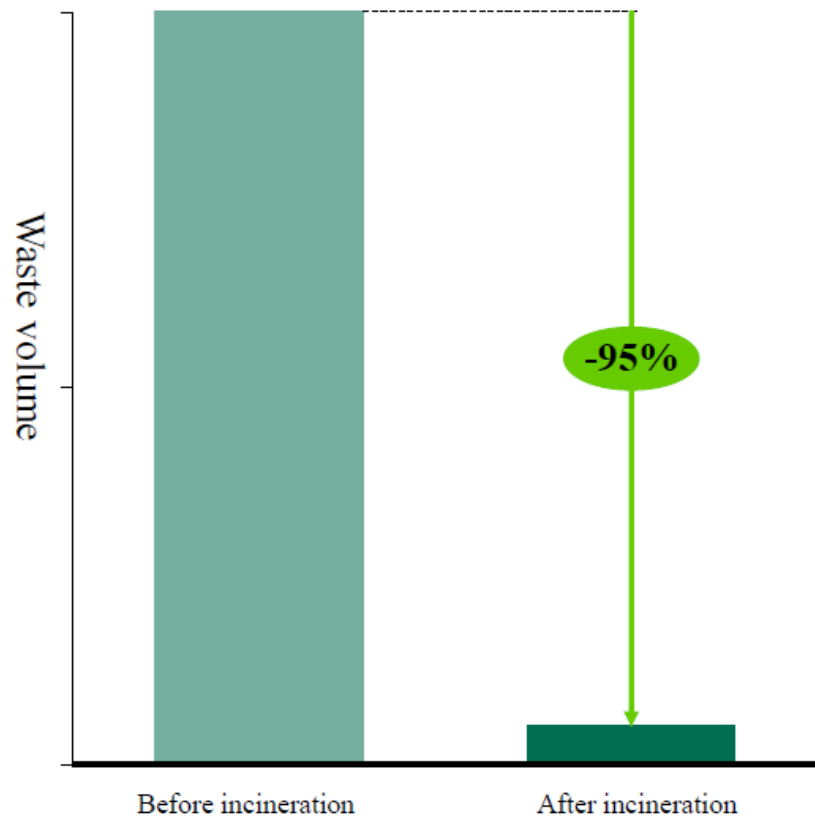
**Greenhouse Effect**



**Odor**

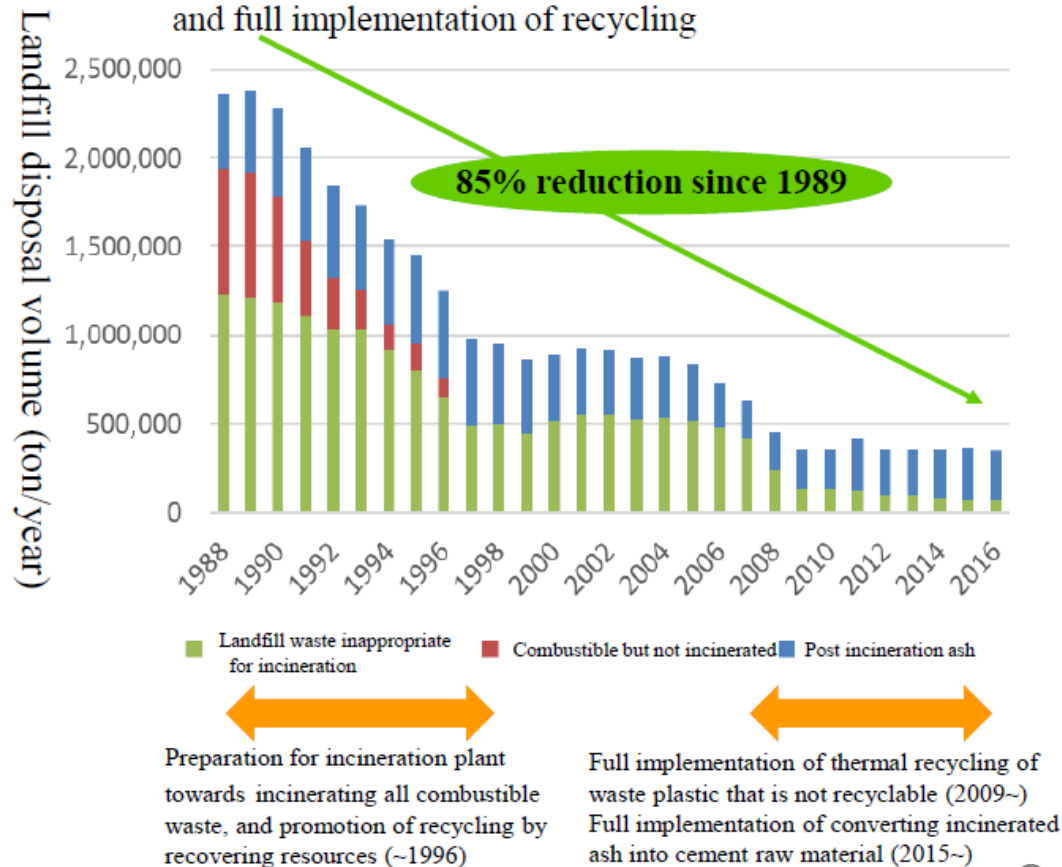
## Volume reduction effect of waste incineration

- Can cut approx. 95% of waste volume, by incineration

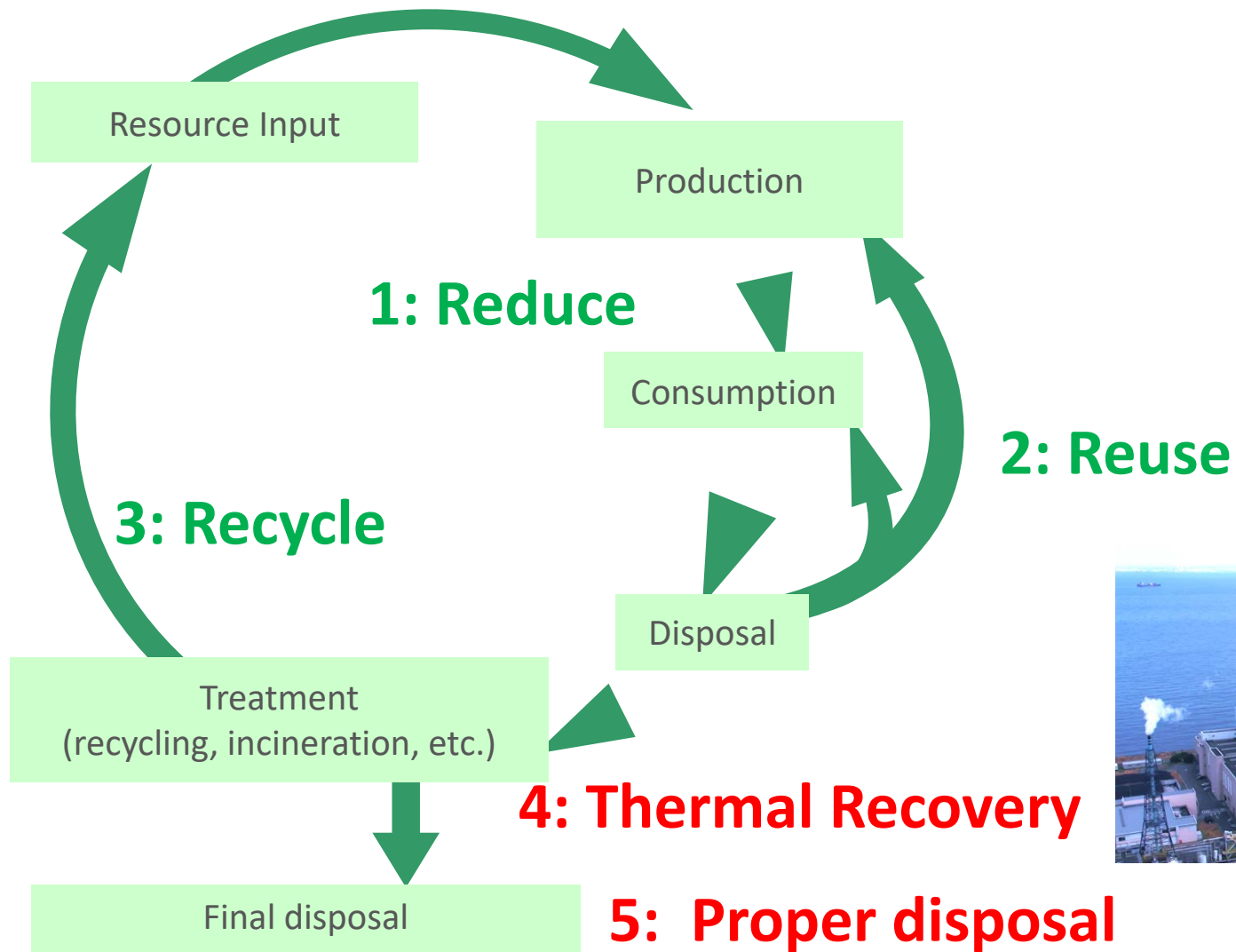


## Trend in landfill disposal volume

- Landfill disposal volume has decreased 85% since 1989, as a result of reduction in volume through incineration and full implementation of recycling







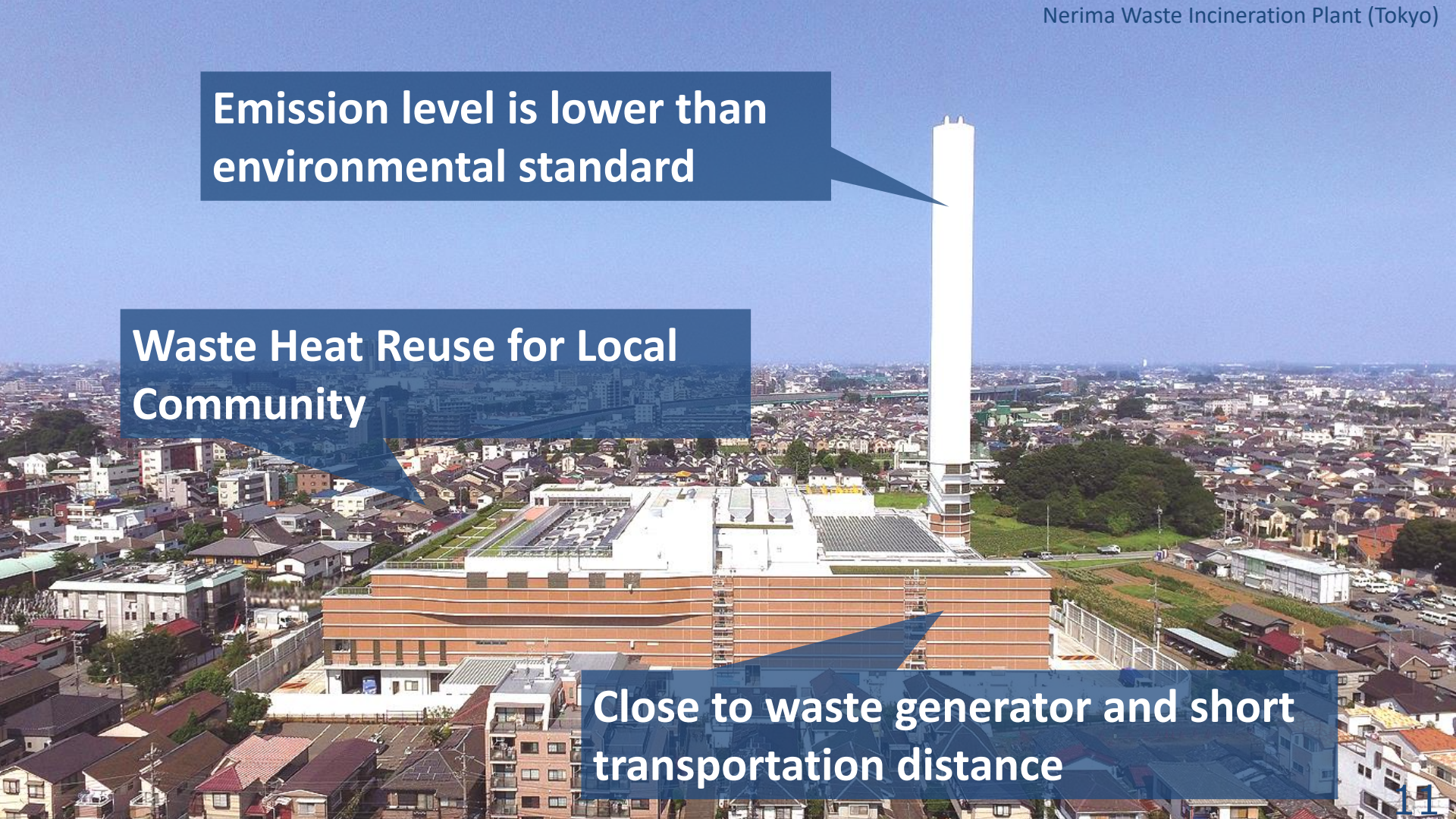




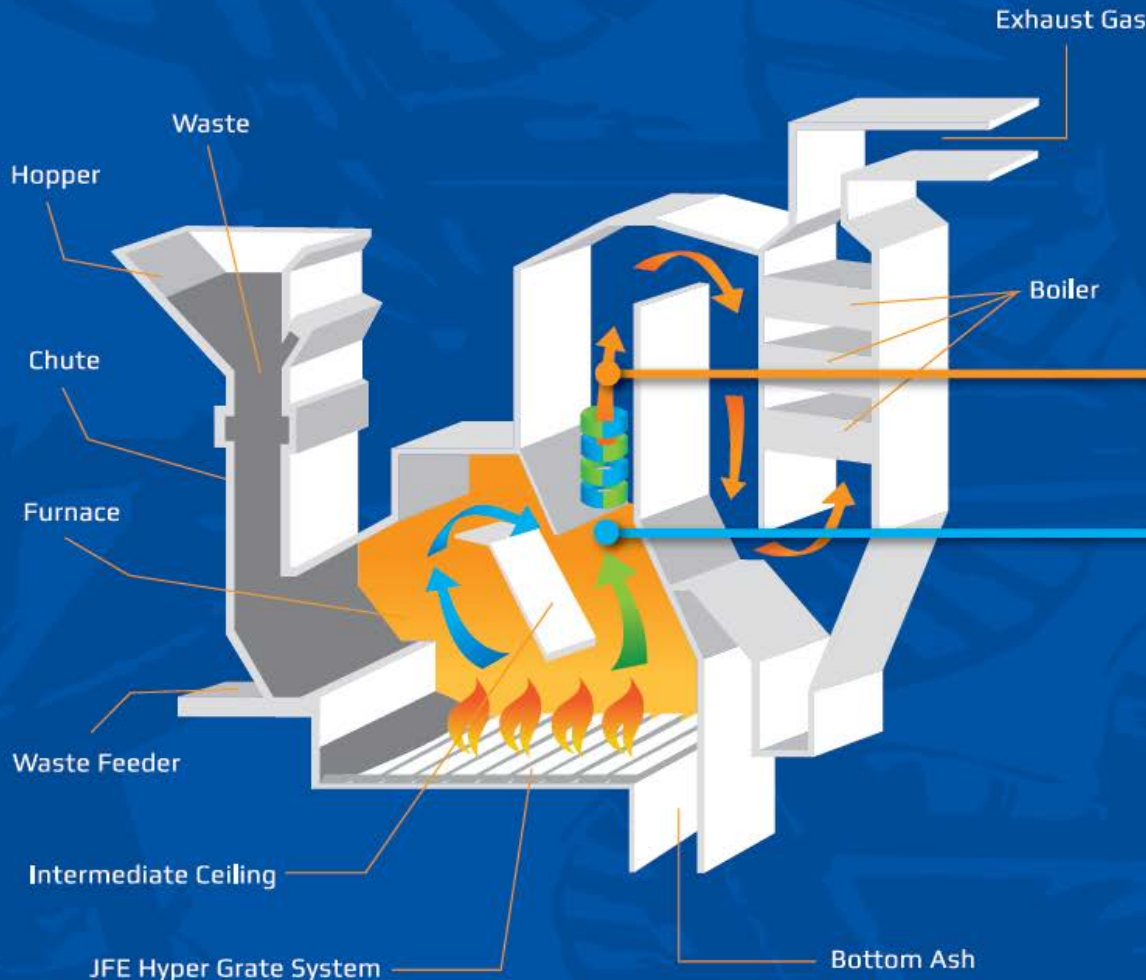
Emission level is lower than environmental standard

Waste Heat Reuse for Local Community

Close to waste generator and short transportation distance



# Proposed Technology (Moving Grate Furnace by JFE)



Efficient Combustion Achieved.

↪ ↓NO<sub>x</sub> & ↓CO ↪ ↓DXN

The combustion gas mixture caused by this collision promotes the following oxidation/reduction chemical reactions:

↪ Unburned Gas Contents :  
CO, H<sub>2</sub>, NH<sub>3</sub>

↪ Combustion Gas Contents :  
O<sub>2</sub>, NO<sub>x</sub>, CO<sub>2</sub>

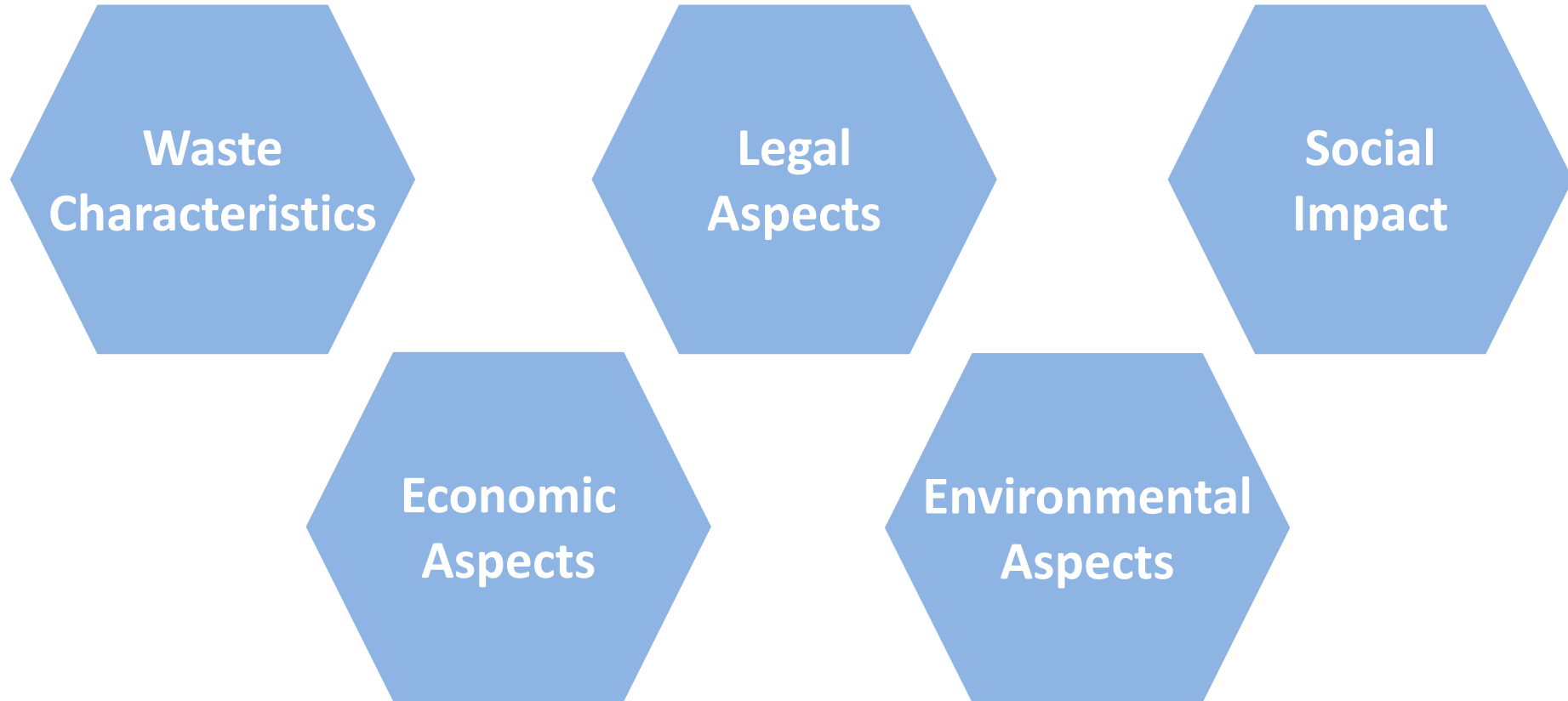


Unburned Gas Reaction :  
 $2CO + O_2 \rightarrow 2CO_2$

Combustion Gas Reaction :  
 $NO_x + NH_3 \rightarrow N_2 + H_2O$



## ■ Challenges for implementation of WTEs



Planning  
(pre-FS)

Design  
(FS)

PQ  
Tender

Build

Operation  
/Maintenance



### Stop at Planning Stage

- Weak policy enforcement, public opposition, no financial source, no supporting regulations, etc.



### Stop at Designing Stage

- Reject of proposal by a competent authority, opposition from existing stakeholders, lack of budget, gap between proposal and needs, etc.



### Stop at PQ/Tender Stage

- Unsuccessful PQ/tender due to conflict of price (tipping fee, etc.), etc.



### Stop at Operation Stage

- Insufficient performance of facility, critical change of waste management policy, bankruptcy of operation company, etc.

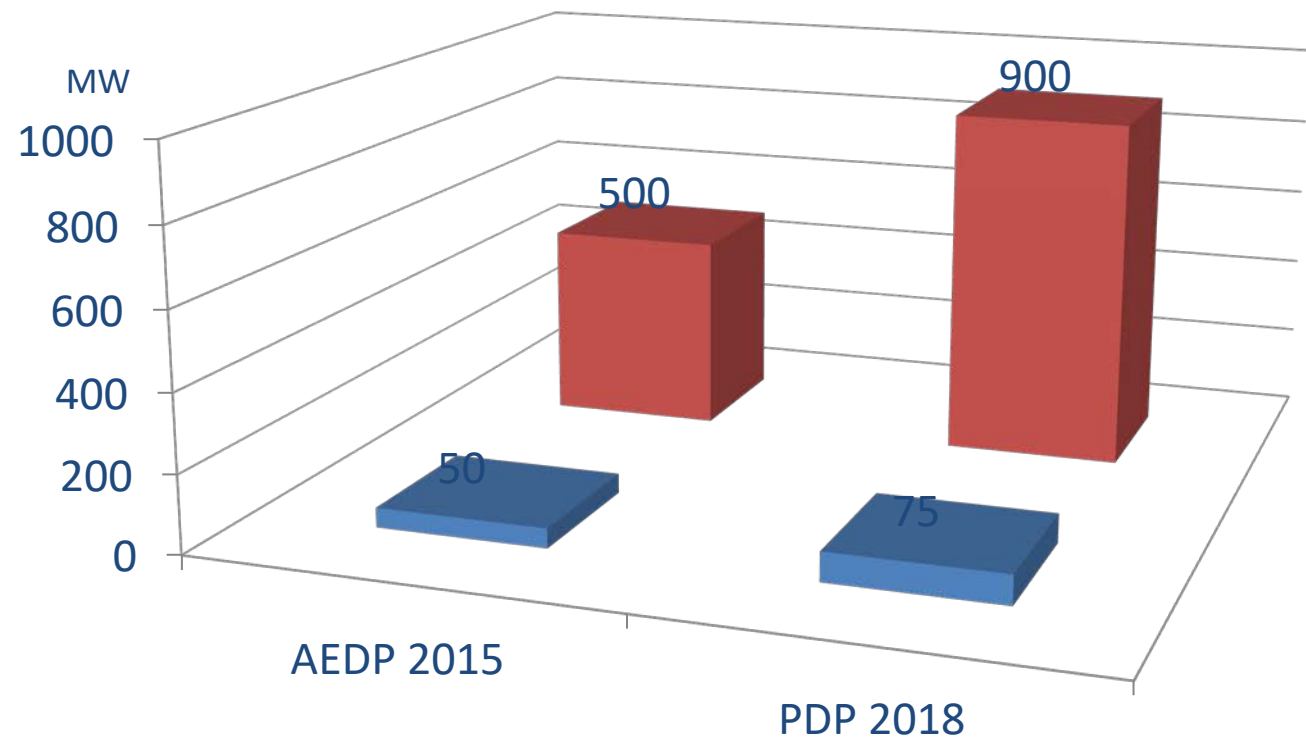


## ■ Industrial WTE Projects in Thailand

Company	Capacity-Gross (MW)	Capacity-Net (MW)
PG & C5714	3.00	2.50
Chonburi Clean Energy (CCE)	8.63	6.90
Sabangyangyuen Pichit	2.00	1.88
Progress Intercame Thailand	4.80	4.00
Eva Grand Energy	4.00	3.00
Recovery House	7.00	5.50
SCGA Cementthai	8.00	7.00
Total	37.43	30.78

# Project development target of WTE in Thailand

■ Industrial Waste   ■ Municipal Solid Waste

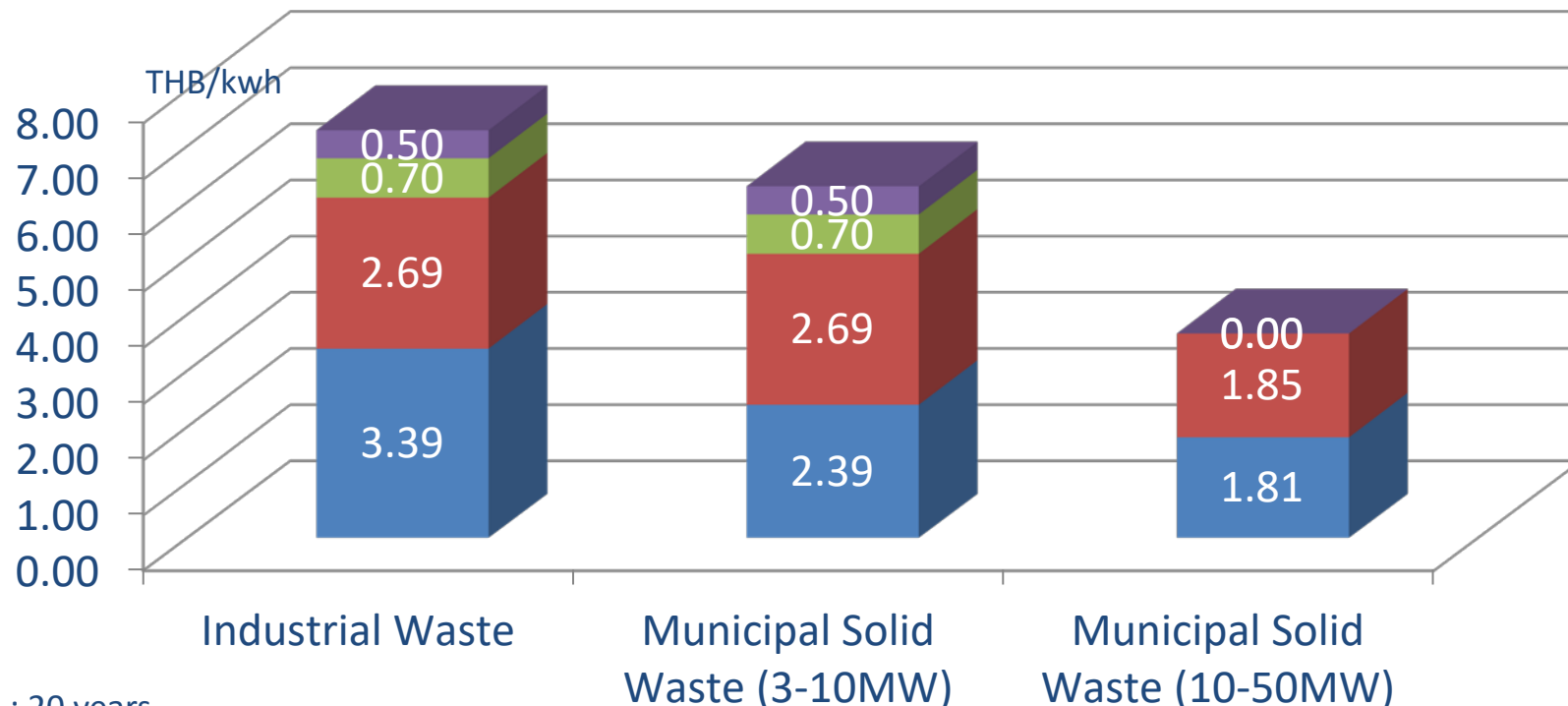


AEDP : Alternative Energy Development Plan  
PDP : Power Development Plan



# Current FIT scheme for WTE in Thailand

FIT-F   FIT-V   Premium1   Premium2



Period : 20 years

FIT Premium 1 : for year 1-8

FIT Premium 2 : For 3 designated provinces in South Thailand (for whole project period)

# ■ Characteristics of Industrial and Municipal solid waste

Solid Waste from Industries



Mixed papers, dirty plastic bags, rubbers, etc.

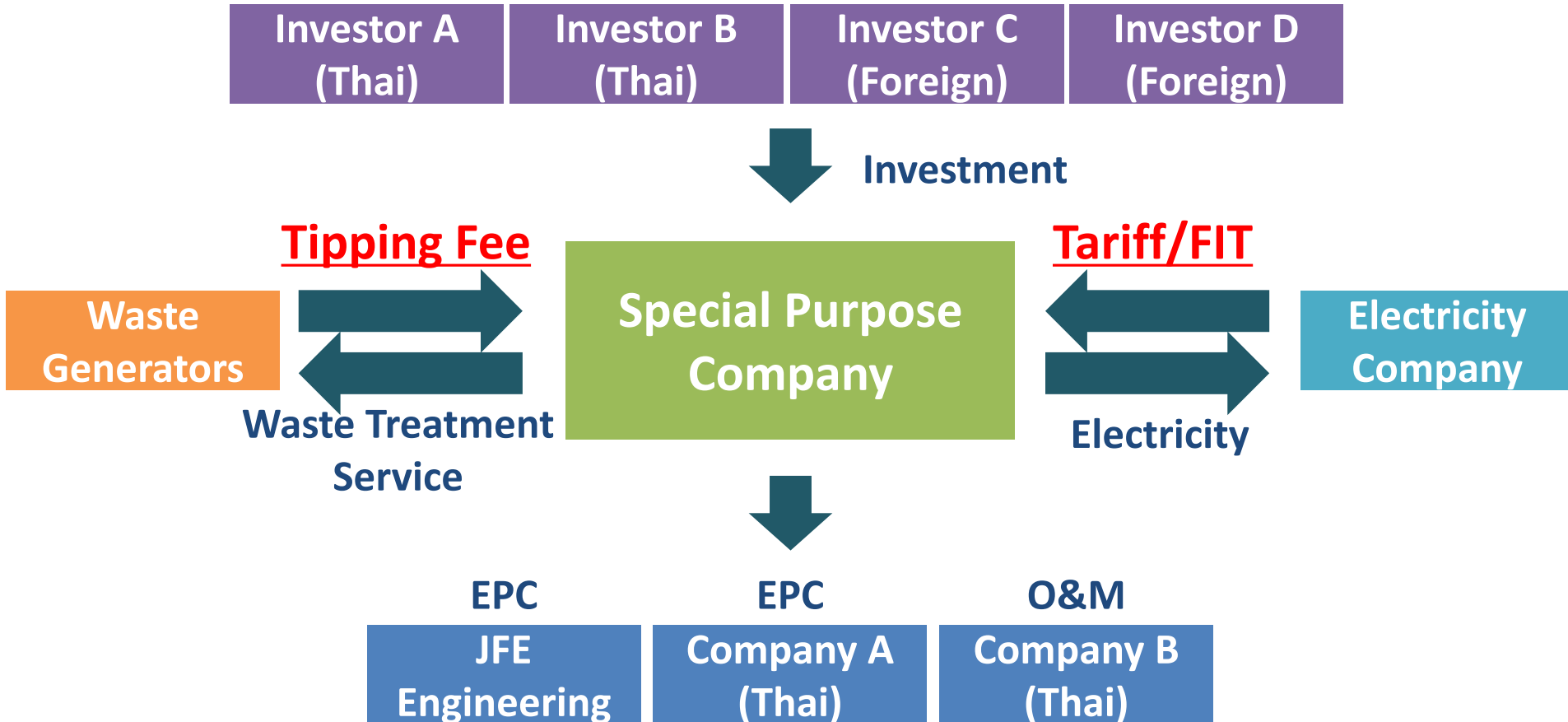
Solid Waste from Households



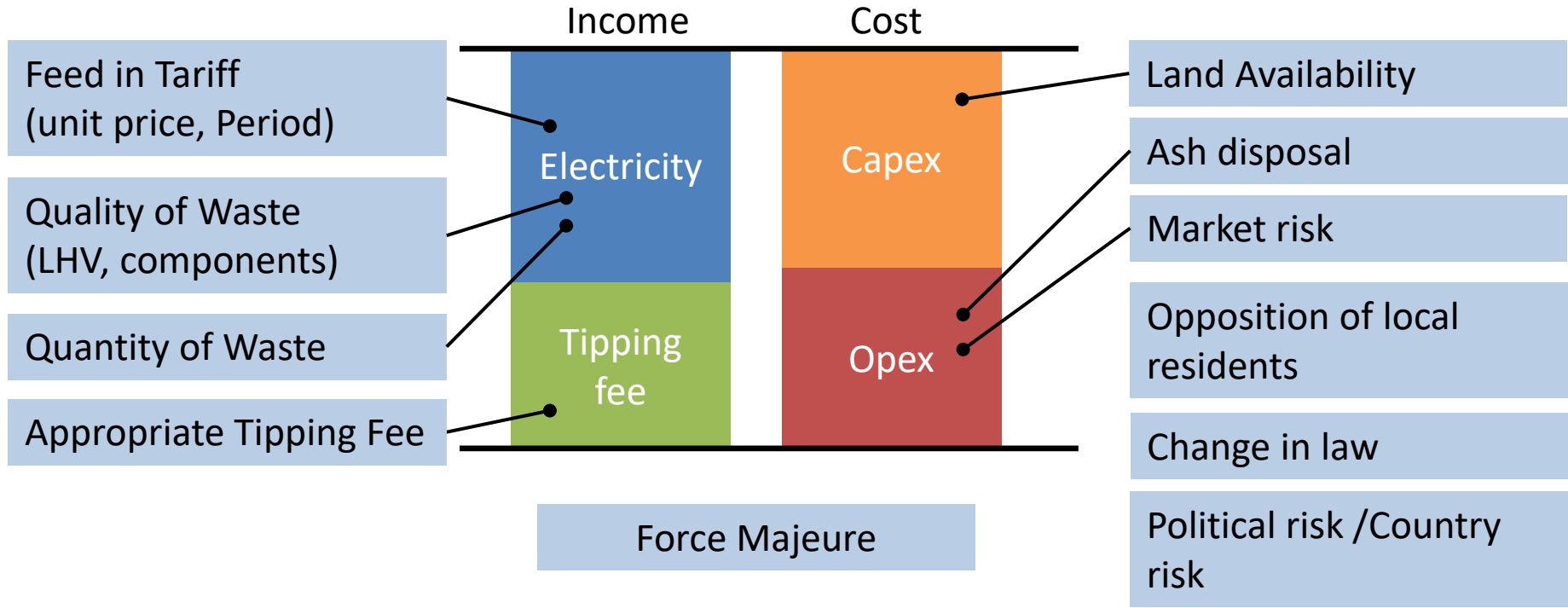
Plastic bags, green wastes, food wastes, etc.



# Proposed business scheme



# Potential Risks of WTE Project



Appropriate income (FiT, T/F) must be secured



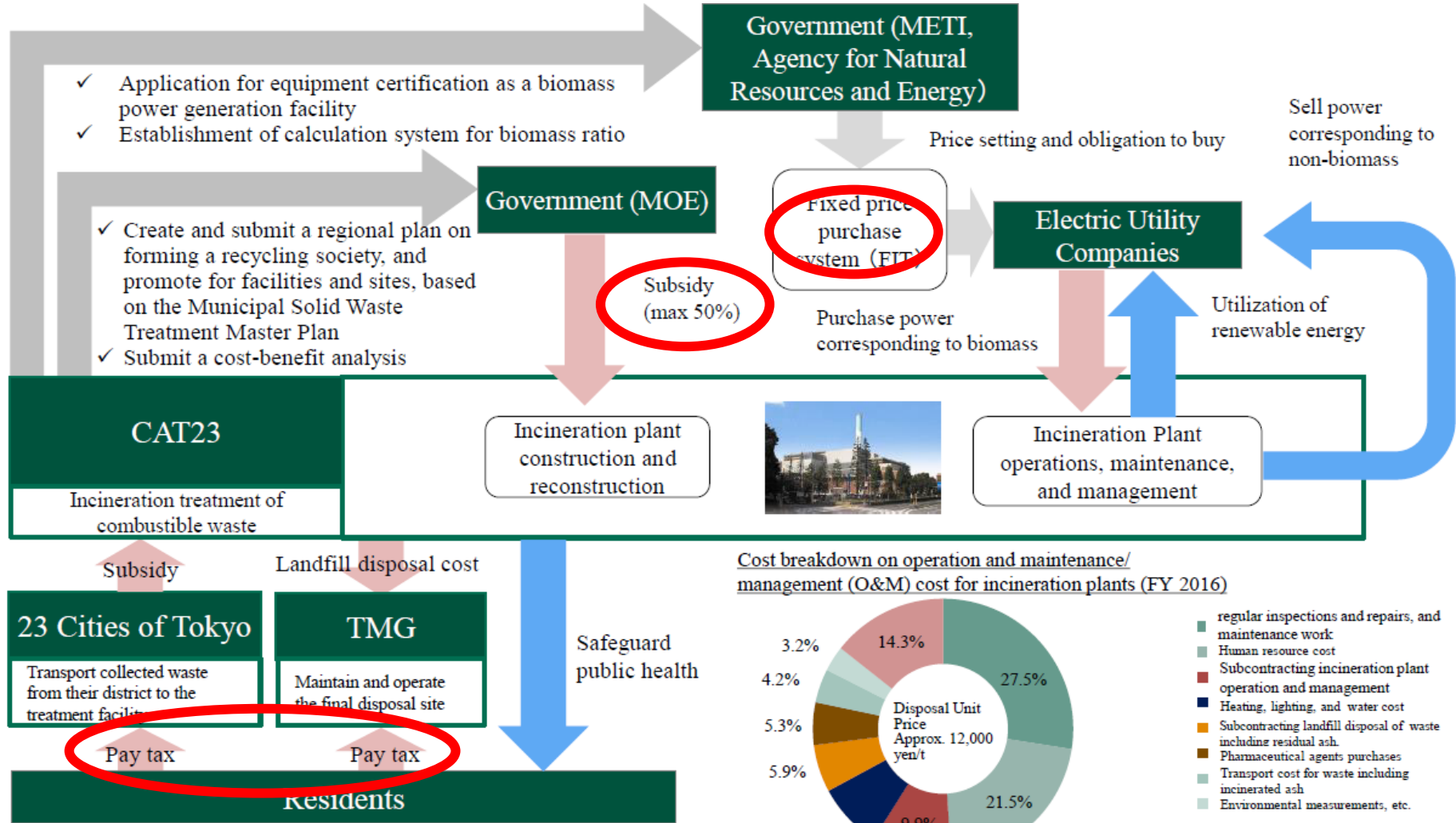
**Feasibility**

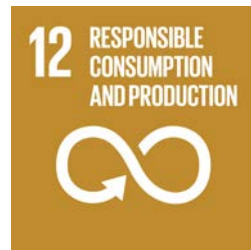
**Profitability**

**The prime objective of MSW-WTE should be proper waste disposal for the people ; waste heat power generation may be a bonus.**









# Thank you

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