

Data Collection in Developing Countries for Fuel-Conversion of Waste Plastics

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What is the role of waste-data?

- **Waste-data is a basic requirement for the establishment of proper waste management & recycling.**
- **In the establishment of eco-recycling technology, management of waste-business & environmental preservation measures etc, are executed depend on waste data with high reliability .**

Keyword: Waste Plastics Processing

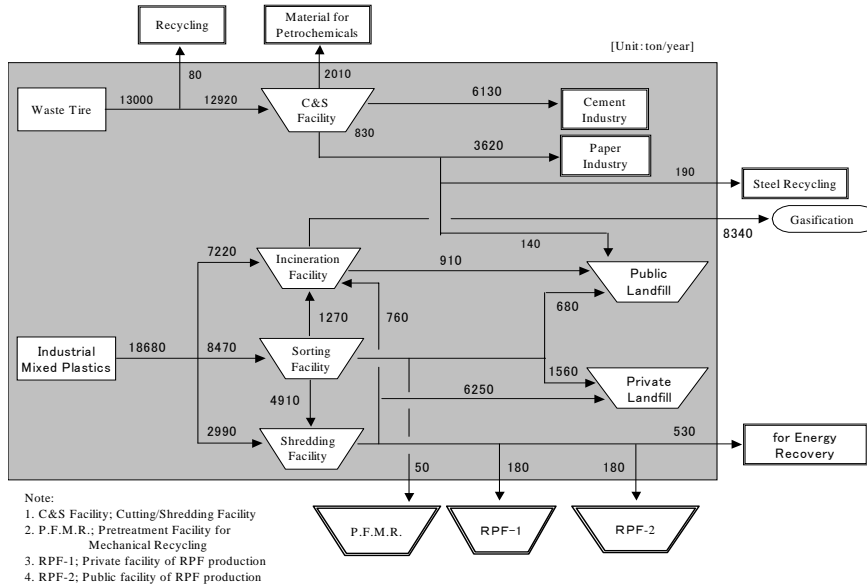
- **Fuel Conversion**
- **Waste Treatment**
- **Recycling**
- **Developing Countries**

Requirement for establishment of reliable statistics in developing countries

- **Obligation of measurement in transfer-waste**
→MSW, Ind.waste, Hospital waste, Home appliances, Vehicle etc...
- **Equipment of measurement facility**
- **Establishment of Manifest system**
- **Management of Export/Import goods**
- **Supervisor by Measurement law**
- **Technology that can select kind of waste-plastics**

Current Material Flow Chart of Waste tires & Ind.mixed Plastics

Ref: Matuo,Tojo



Processing Flow of Waste Plastics

Ref: Matuo,Tojo,Ohmura

<Municipal waste>

Plastics in combustible waste,
Plastics in incombustible waste,
Plastics in bulky waste,
PET bottles,
Plastic packaging

<Industrial waste>

Plastics for RPF,
Waste tire,
Mixed waste plastics,
Sorted plastics,
Foam plastic

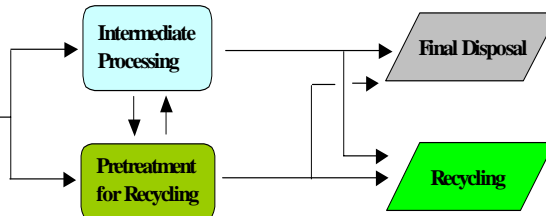
Cutting/Shredding facility: 5 places

Sorting facility: 2 places

Incineration facility: 3 places

Landfill: 2 places

Waste plastics



Facility for mechanical recycling: 6 places

RPF production facility: 4 places

Steel factory: 1 place

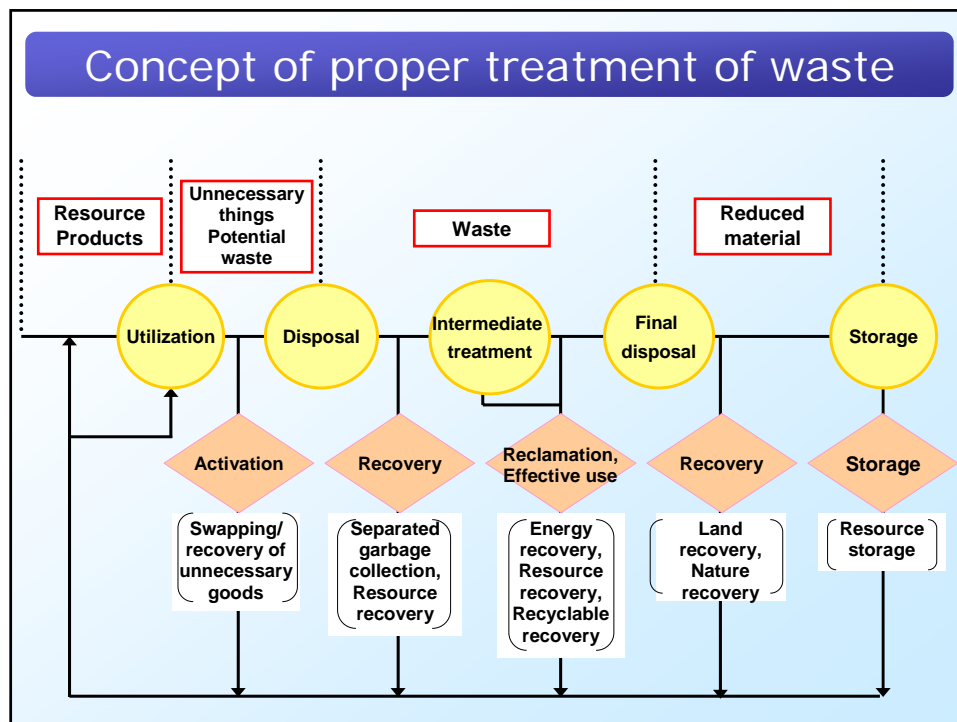
Cement/Paper factory: 4 places

Government should do for establishment of W.P data

- Clarification of flow- data of waste plastics
- Notification of Guideline
 - ⇒ Method, Guidance, Target, Obligation, etc...
- Social educational campaign for separation , sort collection & recycling
- Introduction & Maintenance of related infrastructure
- Standardization of fuel quality....
- Presumption of domestic stock ?

Enactment situation of laws in Asian countries

	Waste management related Legislation	Legal regulation related to recycling				
		Basic act	Individual act			
			Containers packaging	Household electric appliance	Vehicles	Others
China	● (1995)	Under consideration		Under consideration	Under consideration	
Taiwan	● (1974)	● (2002)				
Korea	● (1986)		● (1993)	Under consideration	Under consideration	
ASEAN5	● (Completion by 1997)					
Japan	● (1970)	● (2000)	● (1995)	● (1998)	● (2002)	Construction. foods (2000)



Item of waste plastics statistics for fuel conversion

Weight :

Kind of Plastics: PP,PE,PS,PVC.....

Shape: Chip, Solid, Pipe, Plate, Bottle, EPS, PSP, XPS,

Element: CmHn, Cl, N, S, Ash, Water, Metal,...

↓ ↓

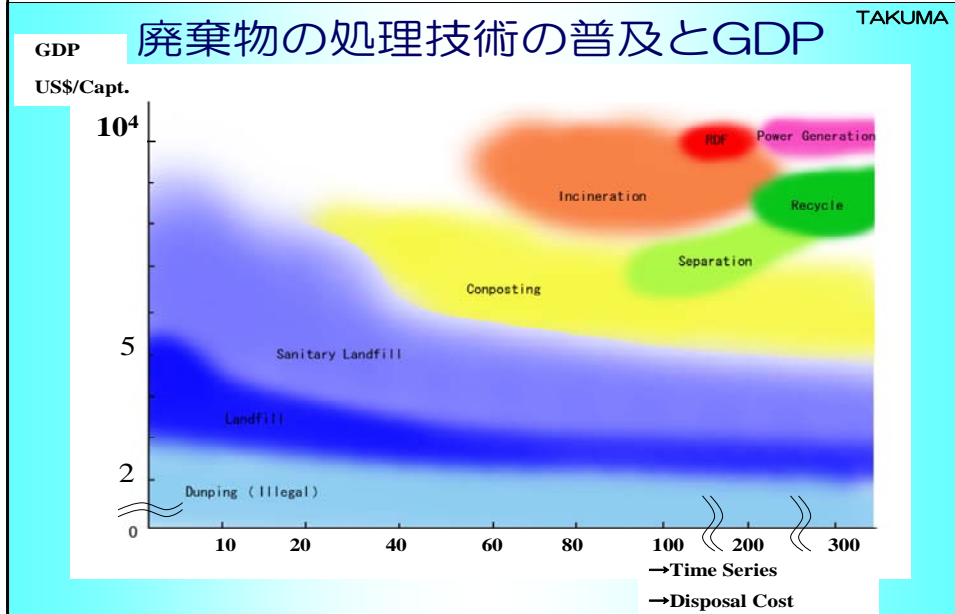
Are there infrastructure & technology that can take these data in developing country?

- Who bears the cost?
 - Government, Ind.sector, Disposal sector,....
- Which organization does supervises & manage ?
- Are there guideline & rule ?

Present Situation of Waste Plastics in ASEAN

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Waste Management Technology & GDP



Process to W.P fuel recycling

- Is energy conversion matched from the aspect of waste management & GDP.
- Does W.P fuel become a business?
 - Is it business that can be independent?
 - Cost performance
 - Can the energy-recycling market be formed domestically ?
- Measures of employment conversion of present recycle market ?

Collection scenery of valuable resource Hanoi, Vietnam



Collection scenery on street : Hanoi



Transportation in Recycle town : Hanoi

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Plastics Sorting work in Trieu Khuc Town
Hanoi

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Sorting work Trieu Khuc

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Collection Scenery in URENCO
Properties & Composition are uncertain until dumping.
A lot of plastic contained



Nam Song Landfill , URENCO
Waste Plastics \cong 10 ~20%vol



Temporary Storing of waste plastics
-Rubber & Fiber mixed-



Waste Plastics separated by hand sorting



Hand Sorting : HCMC



MSW container: PJ , Malaysia

Contained a lot of garbage-sorting is difficult



Final Disposal :Malacca



Weight measurement facility RCB :Thailand



Collected Plastics Bottle



Collected Waste Plastics



**Weight Measurement on Town Recycler
-BKK-**



Illegal disposal in Nonthaburi



Waste Bank system on Nakhon Pathon



What data is necessary to use
W.P as fuel ?

-The reference by combustion system-

Fuel conversion Technology

- Solidification :RDF(Pellet, Fluff, Powder...)
- Shedding : Chip
- Pyrolysis / Gasification
- Liquefaction
- Reducing Heat recovery

Combustion System

Demand data is different according to
combustion/gasification system

- Factor of Combustion

Temp. Speed. O₂. Ash. Ignition.....

- Combustion system

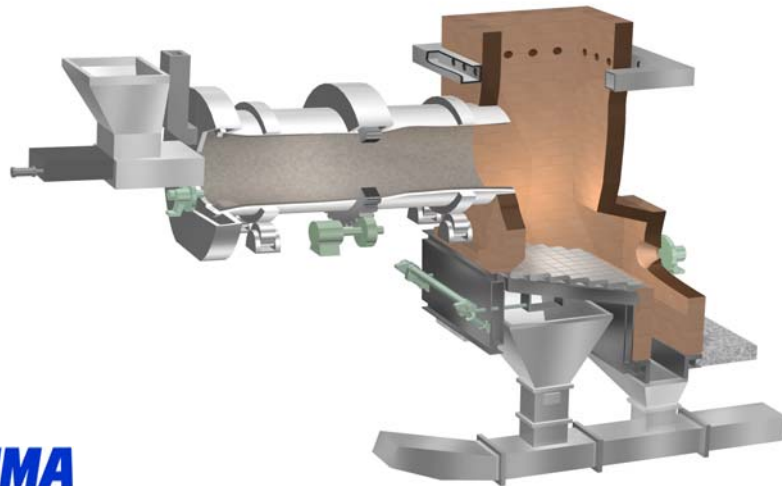
Stoker

Kiln

Burner

BFBC/CFBC etc.....

Kiln & Stoker type combustion
Bulky size waste

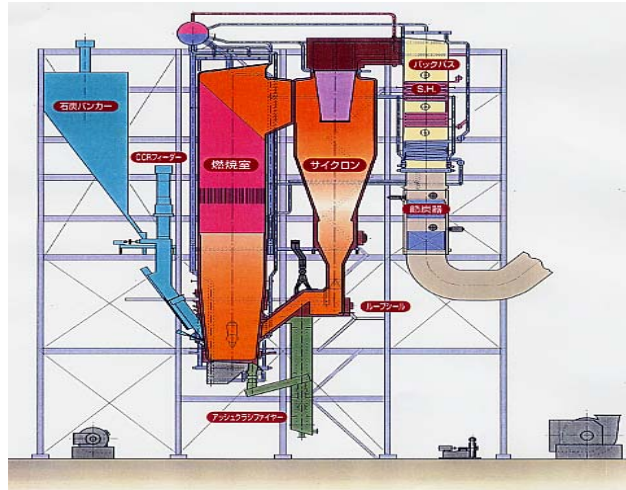


BFBC boiler

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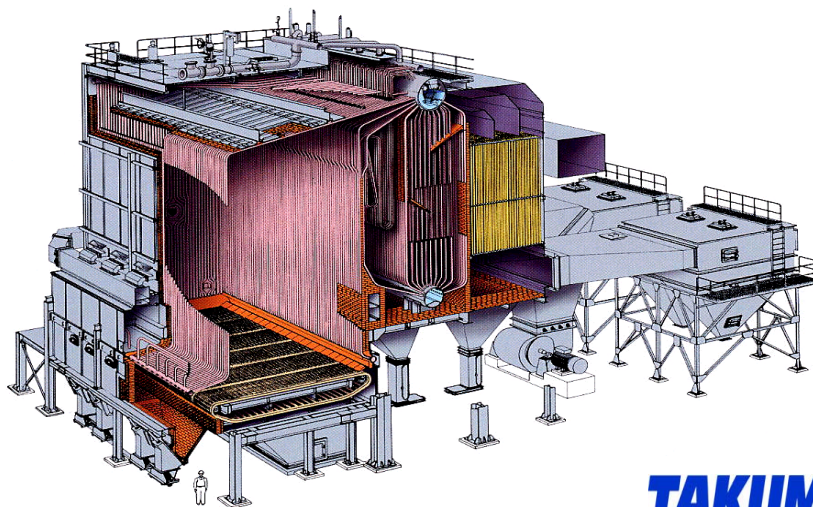


CFBC: RDF、Chip、Dust



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Travelling stoker : Chip, Dust



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**Dual-fuel power station
(Biomass+RDF)**



**Thank you
for your attention**

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