DEPARTMENT OF ECONOMIC AND SOCIAL AFFAIRS

UNOSD
UNITED NATIONS OFFICE FOR SUSTAINABLE DEVELOPMENT

Key points of Waste Management Experience in Republic of Korea

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26-August-2025

Introduction to UNOSD

- **Project Office under the UN DESA**
- **Located in Songdo Incheon, Republic of Korea**

Overarching Objective

- **Strengthen the capacity of UN Member** States to plan and undertake **integrated sustainability transformation,** particularly in the context of **the Agenda 2030 and the Sustainable Development Goals (SDGs)**

Main focused area: Environmental SDGs

UNOSD & MoE of Korea

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Ministry of Environment
Republic of Korea

- **UNOSD and MoE of Korea have closely collaborated under partnership in** the environmental field.
- **UNOSD plays a bridging role** between Korea and Member States to convey the best practices in environmental domain of Korea.

Contents

I. Life cycle of Waste Management

1

Life cycle of Waste Management

Waste management: Context-based approach

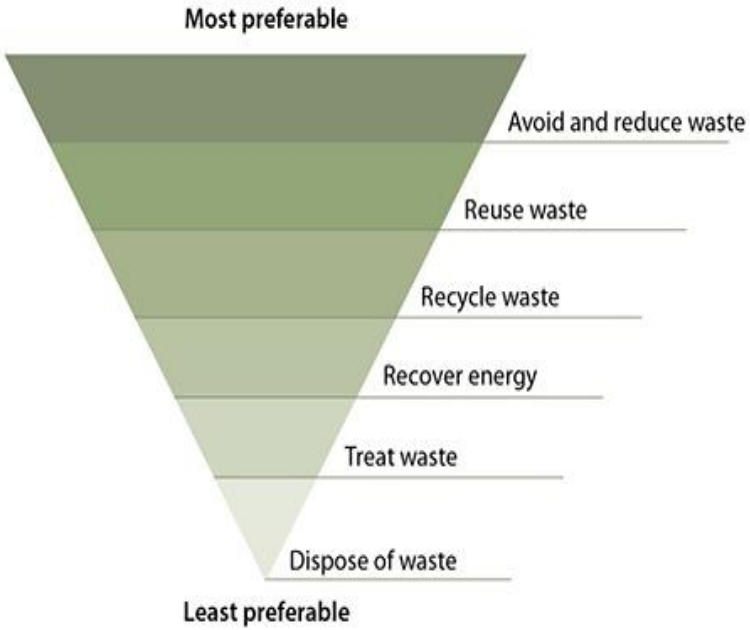
- **Every country has its own *definition*** on waste in national legislation
- ***Classifications*** **on waste also varies** across the countries
- There is **a large variation of the waste *composition*** country by country

Context-based approach in waste management is significantly important

1

Life cycle of Waste Management

Waste Management priority pyramid



Waste Management Hierarchy

Implications

1. Waste management is zero sum game.

2. Waste management is directly connected with transition to a circular economy.

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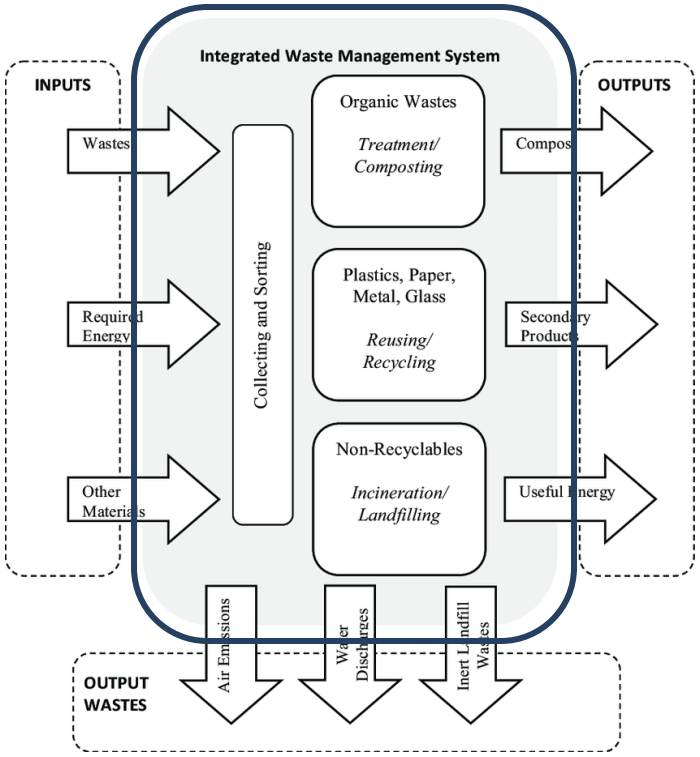
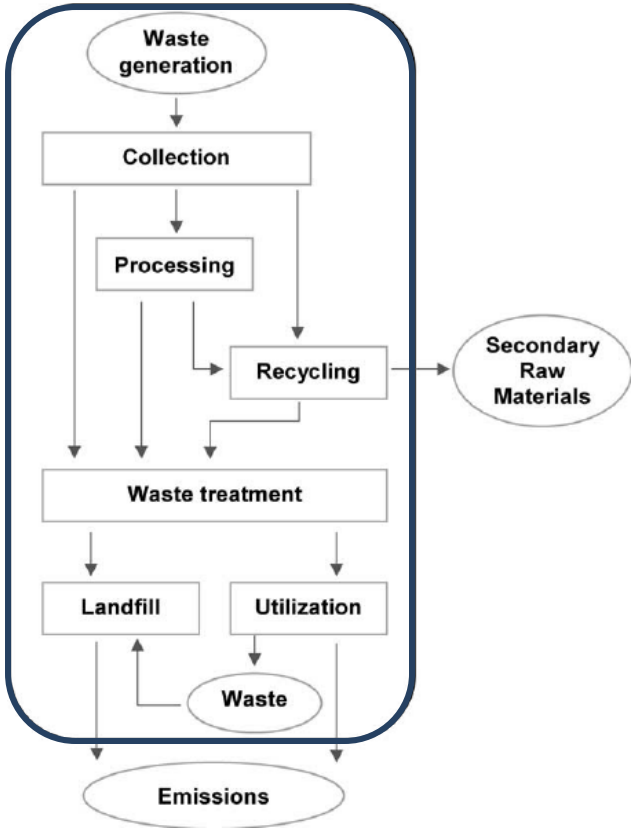
Life cycle of Waste Management

Life-cycle Approach



Waste Life-cycle



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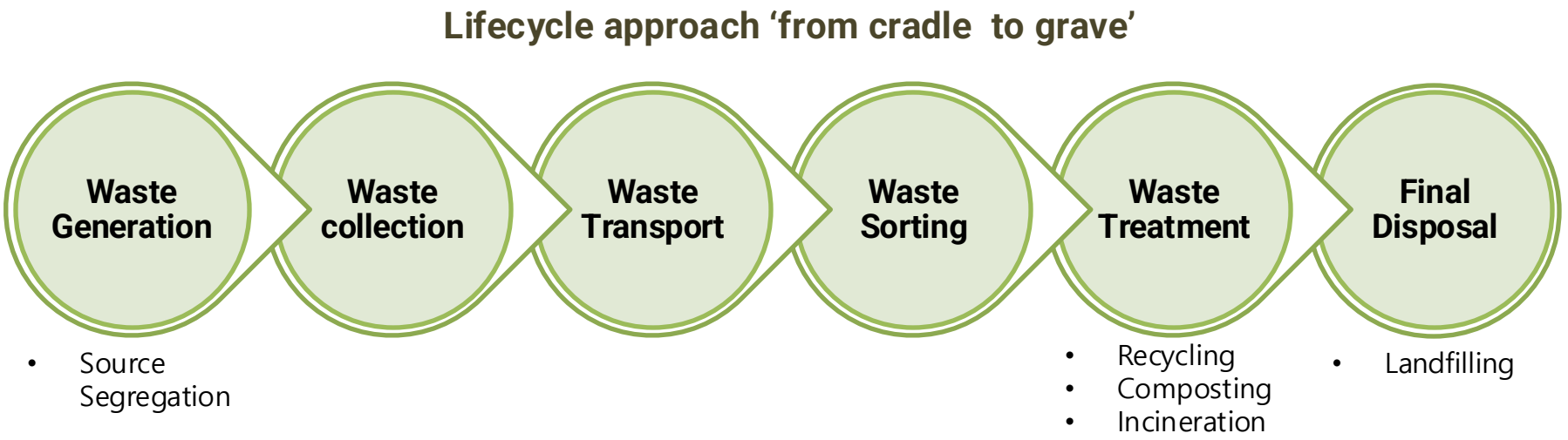
Life cycle of Waste Management

Why is the Life-cycle Approach Important: *Interlinkage*



- **Each stage is closely interlinked with the others.**
- **Life-cycle approach enables waste management to be implemented in a holistic and effective manner.**

1 Life cycle of Waste Management
Source Segregation & Collection

Separate Collection Station
In Apartment

Paper and Cardboard

Can

Bottle

Transparent PET Bootle (2020~)

Other plastics

Vinyl Bags

Styrofoam

Clothes

Food Waste

Cooking Oil

General Waste

Agricultural Waste

E-waste and bulky waste

Electronics

Furniture

Hazardous waste

Battery

Fluorescent lamp

Medications

1 Life cycle of Waste Management
Sorting & Recycling


Transfer station (Sorting facility)

- **Transfer station: MSW is temporarily held and sorted** before heading to;
  - **Landfill**
  - **Incinerator or waste-to-energy plant**
  - **Recycling center**
- **Garbage trucks** that run city routes **drop off their trash here** before it's **loaded onto larger vehicles** and shipped off.
  - Arrival → Unloading → **Sorting and Processing** → Compacting and Reloading
- **Transfer stations often operate hand-in-hand with material recovery facilities or MRFs.**

1

Life cycle of Waste Management

Life-cycle Approach

Household Waste

- Scale : 750 tons/day
- Power Gen. : 6.5MWh

Incineration Facility

Electricity Prod. & Supply

Steam Prod. & Supply

1

Life cycle of Waste Management

Life-cycle Approach

Import/ pre-treatment

Anaerobic digester

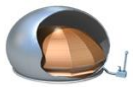
Digestive waste fluid

Waste fluid treatment facility

Compost/dry fuels

Associated Treatment, Discharge

Biogas



Gas storage

Gas utilization facility

Biogas (Biomethane 99%)

Biogas utilization

Provide Urban Gas

Electricity Generation

Charging CNG Vehicles

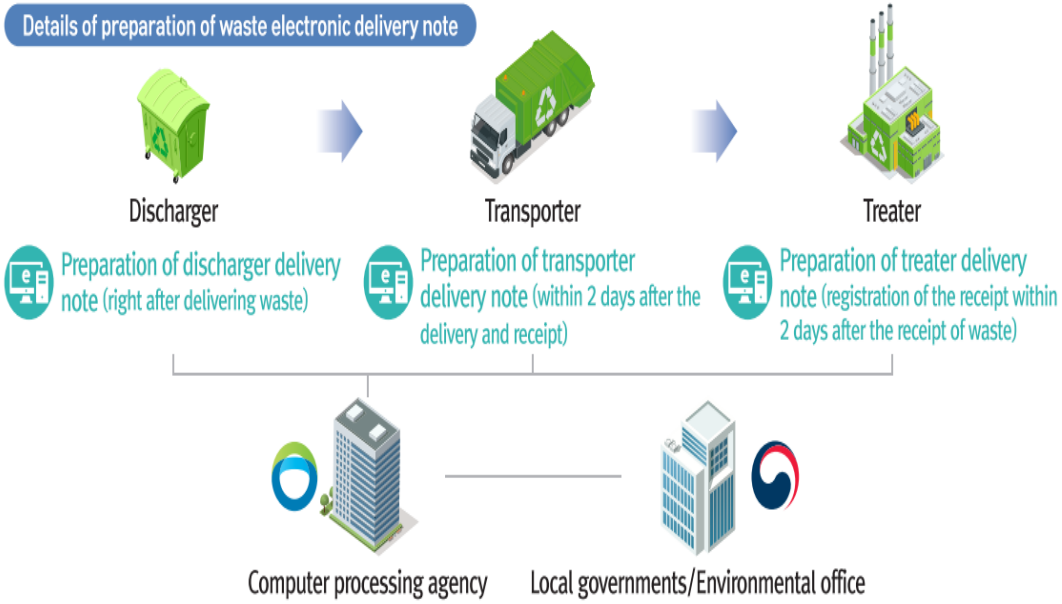
Charging Hydrogen Vehicles

1 Life cycle of Waste Management
Digital Tracking System (Allbaro)

Allbaro is an IT-base total waste management system, which integrates all life management of industrial waste for transparently managing all the processes of discharge to transport and final treatment of industrial waste through the Internet, mobile application, ARS, and RFID technology.

Major content of system

- Request for **approval and permission** for waste
- Preparation/management of waste **electronic delivery note**
- Preparation of various registers related to waste
- **Waste result report**



II. Economic Instruments

2 Economic Instruments
Overview

Command and control law

- Licensing procedures
- Bans
- Emission limit values
- Administrative orders & sanctions

Market-based instruments

- Subsidies/feed-in tariffs
- Taxes, charges, fees
- Tradable permits and quotas
- Liability rules

Voluntary approaches

- Voluntary agreements
- Environmental management systems (e.g. ISO 14001)
- Labelling (e.g. eco-label, energy label)

- **Aim to cut pollution at source**
  - ➢ Set environmental standards
  - ➢ Mandate pollution control
  - ➢ Monitor systems to reduce risks
  - ➢ Prohibit certain activities
  - ➢ Cap the emissions of certain pollutants

- **Financial incentives or disincentives are used to influence polluters'** behavior by incorporating environmental costs and benefits into the budgets of households and enterprises.

- **To encourage less polluting products or companies**
  (ex) consumers may favor products bearing "Ecolabel", which gives producers the incentive to manufacture fewer polluting products

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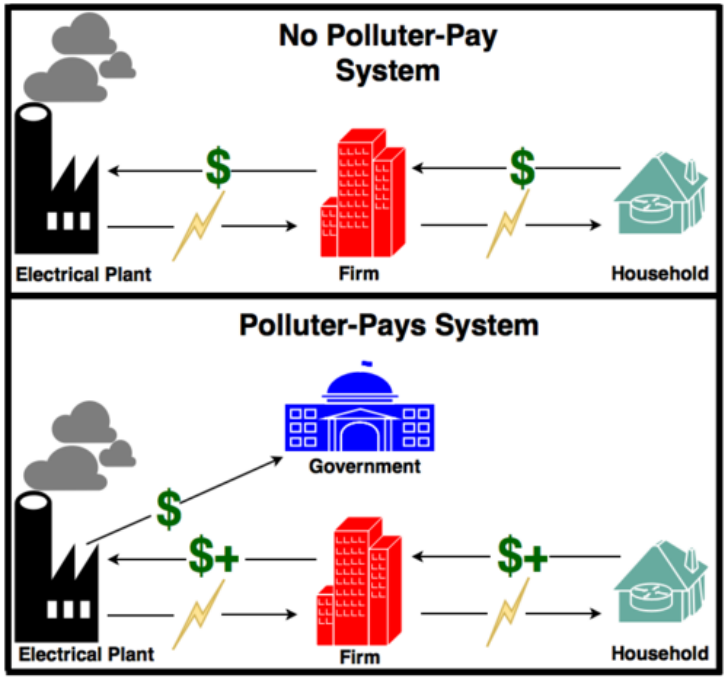
Economic Instruments

Key Element for Waste Management Regulations

Polluter Pays Principle (PPP)



- **Waste producers (industry, households…) should pay for the collection, treatment, and disposal of the waste they produce.**
- Expected outcome:
  1) **Reduce waste pollution**
  2) **Minimize social cost**
  3) **Partially compensate for managing the waste pollution**

Waste Generator → Pay-as-you-throw

2 Economic Instruments - Polluter Pays Principle (PPP)

Pay-as-you-own vs. Pay-as-you-throw

Bigger house, More charge:
Property tax-based

Waste Collection Charging Scheme

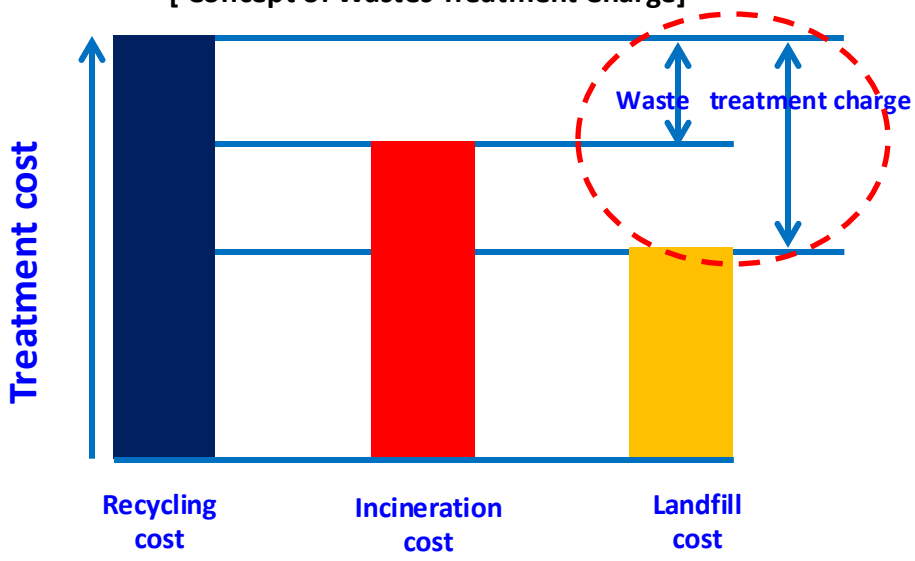
Behavior change intended

More waste, More charge:
Volume-based

2 Economic Instruments
- Waste Disposal Charge

- Wastes treatment charges are imposed to fill the gap among treatment method.
- Economic inducements are introduced in order to reduce incineration and landfill and promote recycling.

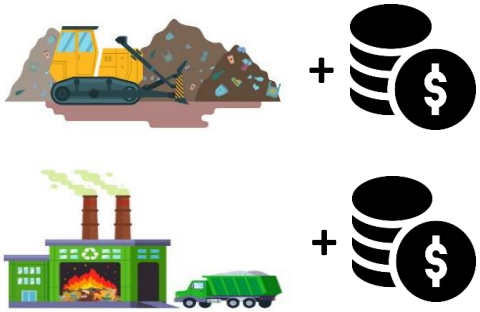
[Concept of Wastes Treatment Charge]



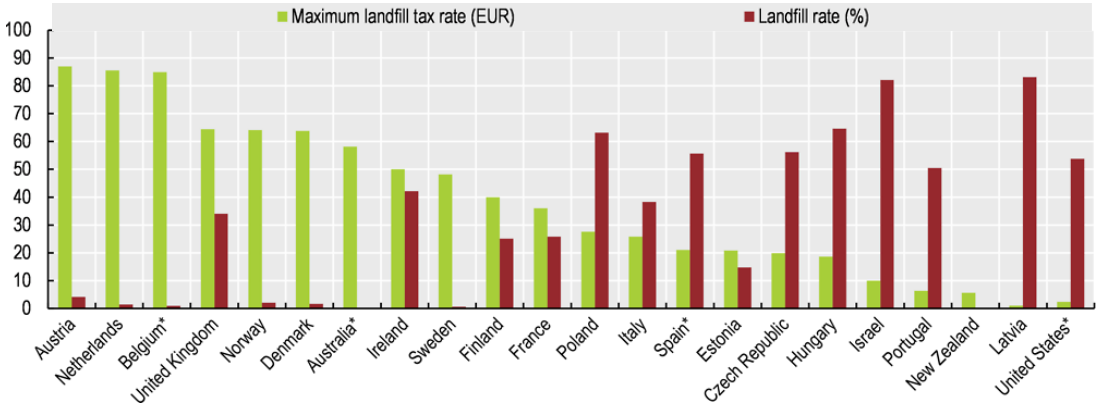
Waste Type	Landfill	Incineration
MSW	**15 won/kg**	**10 won/kg**
Industrial waste (combustible)	**25 won/kg**	**10 won/kg**
Industrial waste (incombustible)	**10 won/kg**	**-**
Construction waste	**30 won/kg**	**10 won/kg**

2

Economic Instruments
- Waste Disposal Charge



Municipal waste *landfilling and tax rates*, 2013



Countries with high landfill taxes tend to have low landfill rates

2

Economic Instruments

- EPR : Extented producer Responsibility

Extending producer responsibility to the <u>end of a product's life cycle</u>:

Responsibility? Physically and Economically!

2

Economic Instruments

- EPR : Extented producer Responsibility

EPR, Extended Producer Responsibility

Deposit-Refund System (1992-2003)

- **Manufacturer pays deposit *as much as the products are produced*** → Refunded according to the recycling results
- **Producers' financial burden increased** as the recycling industry was growing less than expected

EPR (2003-Present)

- **Manufacturer's obligation to recycle *a certain percentage*** of products
- Impose charges at 4 to 5 times higher than recycling cost if the mandatory amount is not met

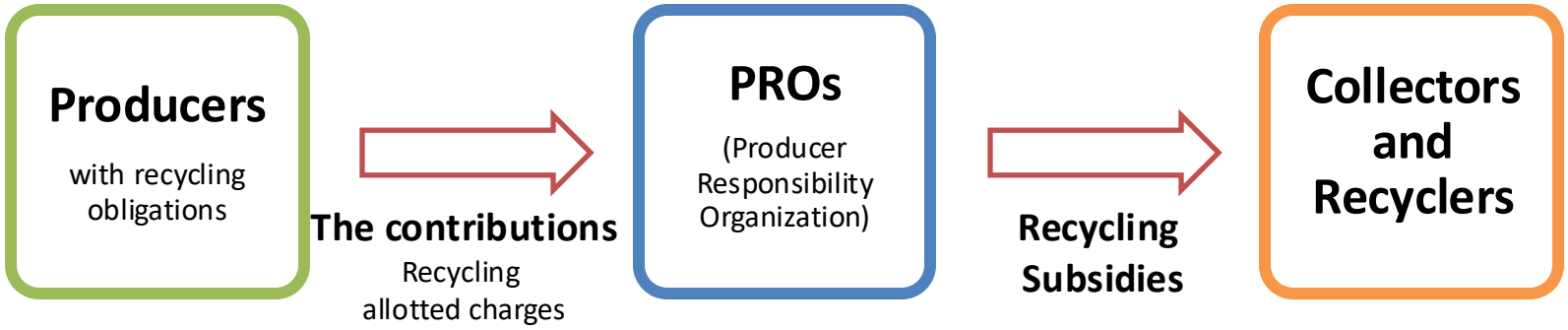
- **Recycling rate:** (2015) 938,000 tons → (2022) 1,675,000 tons **(78% ↑)**
- **EPR Product Scope:** Packaging, Film, Electronics, Products.... + a

2

Economic Instruments

- EPR : Extented producer Responsibility

The flow of EPR system



- According to Article, **contribution** must be paid to the PROs **to fulfill recycling obligations**.
- The MoE and stakeholders engage in assessing the contributions.
- The contributions are assessed by the market.
- The PROs contracts with several collectors and recyclers and distributes the recycling obligations.
- **The PROs gives** some of the contributions **to recycling companies**(collectors and recyclers) **as subsidies** and receives agency fees.

III. Stakeholder Engagement

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Stakeholder engagement

What Are the Enabler for Sound Waste Management?

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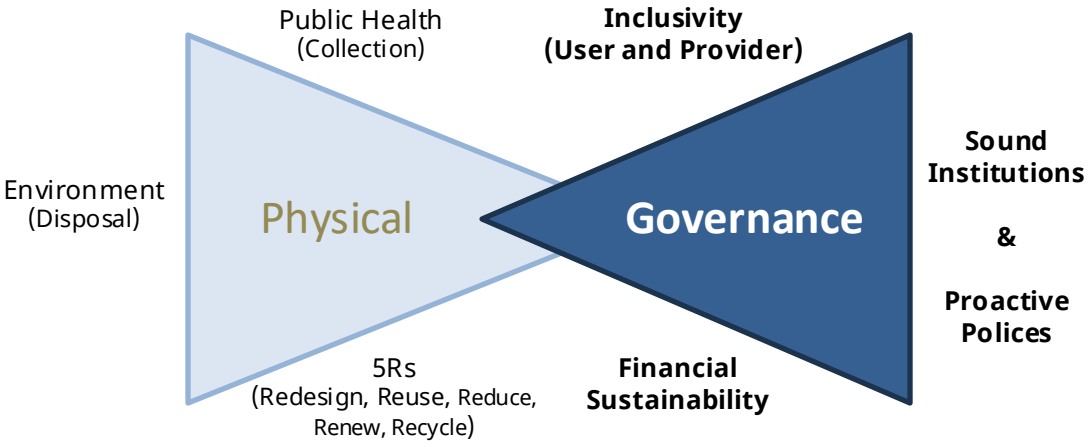
Stakeholder engagement
Governance



"Two Triangle" Analytic Framework for Solid Waste Management

developed by UN-Habitat

3

Stakeholder engagement

Legal Framework

- **Combination of command-and-control measures and market-based approach**
- **Clear depiction of roles and responsibilities** of different levels of government and different players
- **Laws in force** to enhance compliance rate
- Solid waste subject to **national or local laws**
- **Hazardous waste/non-hazardous waste streams** regulated

3

Stakeholder engagement

Stakeholder Engagement

- National Government
- Regional and local governments
- Private sector
- Waste management service providers
- Waste management workers
- Informal sector
- Waste generators
- Members of the community
- Opinion leaders and decision-makers
- Non-government organizations (NGOs)
- Waste experts and academics
- Teachers and other educators

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Stakeholder engagement

Policy and Campaign for Citizen Engagement

Conducted by the government

Deposit System

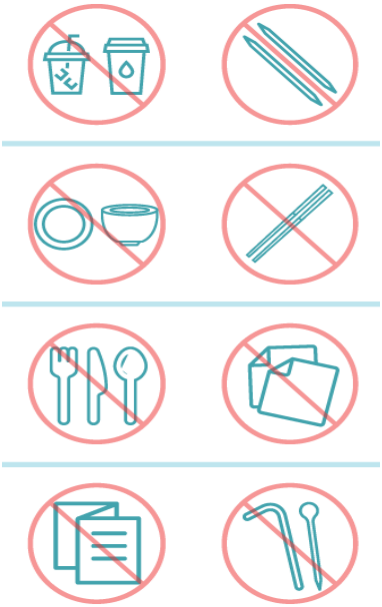
Beverage Container

Disposable Cup

These incentives include
a deposit paid by consumers for empty containers
and handling fees paid by producers
who are responsible for reusing the containers.

Conducted by the local government

Regulation on the Single-Use Items



Conducted by NGOs

 # Bring Your Own Container Challenge

#용기내 #용기내챌린지

용기 Courage Container

An environmental campaign to reduce waste
by using reusable containers
rather than disposable ones
For packing food and ingredients.

IV. International Trends toward a Zero Waste Society

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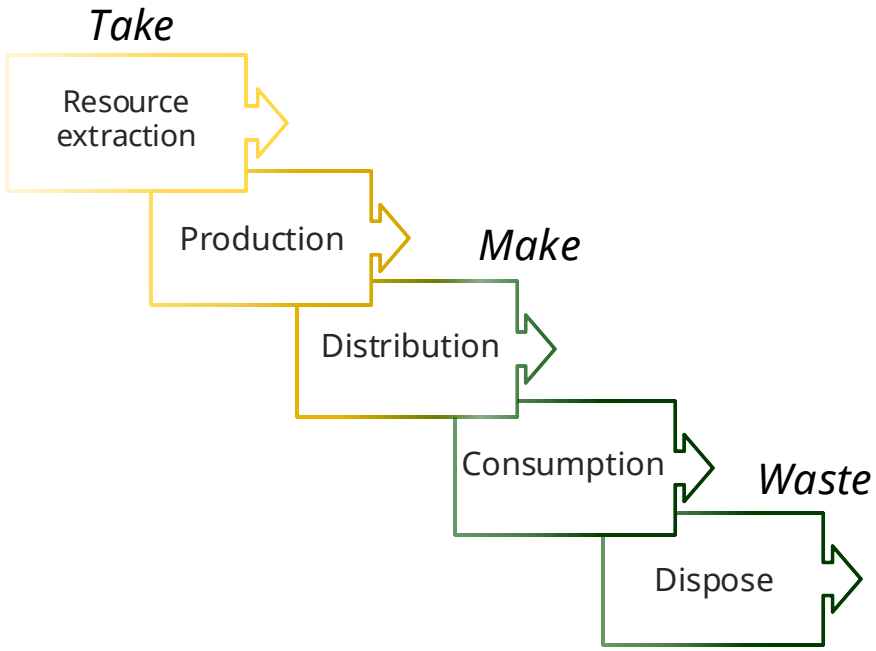
International Trends toward Zero Waste Society

Economic Paradigm Shift : Linear Economy → Circular Economy



Linear: “Take-Make–Waste” model

Circular: “Make-Use-Recycle” model

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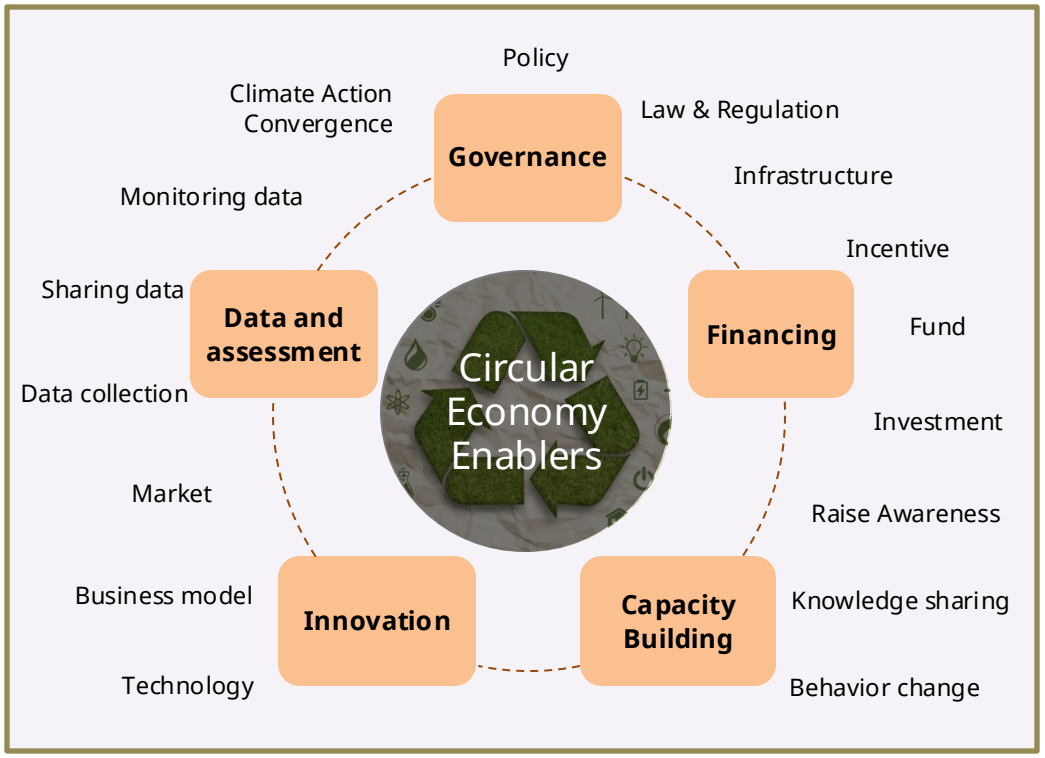
International Trends toward Zero Waste Society

Circular “Economy” = Just “Economy” Paradigm?



The broad definition of “Circular Economy” entails *not only economic shift, but societal transition*.

- **Implies an integrative framework Embedding socio-economic transformation**
- **Emphasizes the need for engaging all relevant stakeholders not only industries**

Source: OECD i-library

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International Trends toward Zero Waste Society

Circularity into Business Models

Adidas now uses **96% recycled polyester** in products with an aim to replace virgin polyester with recycled wherever possible by end of 2024.

H&M-owned brand COS is launching **its own resale business**, a move that will allow customers to buy and sell used COS clothing as a circular and renewable solution.

4

International Trends toward Zero Waste Society

Eco-Design: Key to Zero Waste & Circular Economy Society

- **Eco-design is**

  'a proactive approach in designing products and services that use **minimum resources and energy** and **have minimum negative environmental and social impacts** throughout **their life cycle** while meeting the users' need of functionality and quality.

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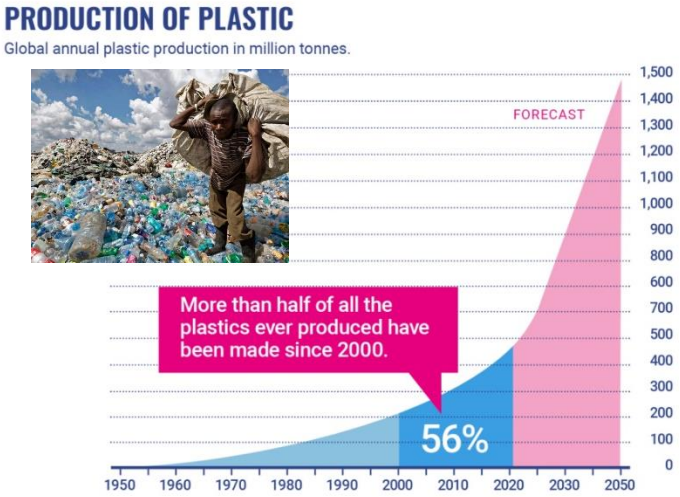
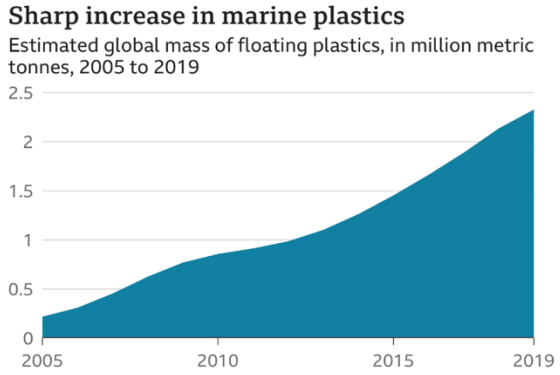
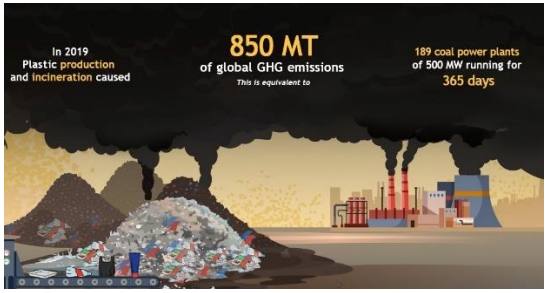
International Trends toward Zero Waste Society

Plastic crisis: From Ocean Pollution to GHG Emission







✓ Global plastic production (ton):

2 million (1950) → 358 million (2017)

- 11 million tons of plastic waste flow annually into oceans. ***This may triple by 2040.***

- GHG emission associated with plastic: ***15% of allowed emissions by 2050***

Key Takeaways

Life cycle of Waste Management

- **Waste Management Hierarchy**
  - **Avoid and reduce > Reuse > Recycle waste > recover energy > Dispose of waste**
- **Life-cycle approach**
  - **Electricity and Steam from Incineration**
  - **H2, Urban gas, Electricity from Bio-gas**
- **Source segregation -> Collection -> Sorting -> Recycling**
- **Digital tracking system : Allbaro**

Economic Instruments

- **Market-based instruments**
  - **PPP : Polluter Pays Principal**
  - **Waste disposal charge**
  - **EPR : Extended Producer Responsibility**

Stakeholder Engagement

International Trends toward Zero Waste Society

- Plastic crisis from ocean pollution to GHG emission
- **Global Plastic Treaty (agreed in 2022): legally binding agreement by 2024**
- Global paradigm shift towards Zero Waste and Circular Economy → **The key is the eco-design**

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