



**Green  
Opportunities for  
Developing  
Economy  
Conference**

4-6 October 2019



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## WASTE MANAGEMENT AND ENVIRONMENTAL SUSTAINABILITY

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**Partners:**



**Sponsor:**



**Project:** Awareness Raising for Civil Engineers on Green Economy  
**Grant Program:** EU Funded *INNOVATION AND CHANGE IN EDUCATION*  
**Grant Contract number:** 2016/373-593



## **International Green Opportunities for Developing Economy Conference (GODEC) 2019**



## What is waste?

**A natural part of the life cycle -In nature, the concept of waste does not exist**

**Human action and behaviour** produce additional flow of material residues that overload the capacity of natural recycling processes

**2.12 billion tonnes** of waste is generated annually besides the **7–10 billion tonnes** of urban solid waste from households, commerce, industry and construction as the 2015 United Nations Environment Programme (UNEP) report summarizes

World waste facts

# 1,514,208,387

**Tons of waste dumped**  
Globally, this year



The World Counts

## What is the “Waste Problem”?

- **Environmentalism’s paradox** (*McGill University*)
- We have become a **throw away society** . We do not mean to be, but .....
- **Not-in-my-backyard syndrome**

### *The paradox:*

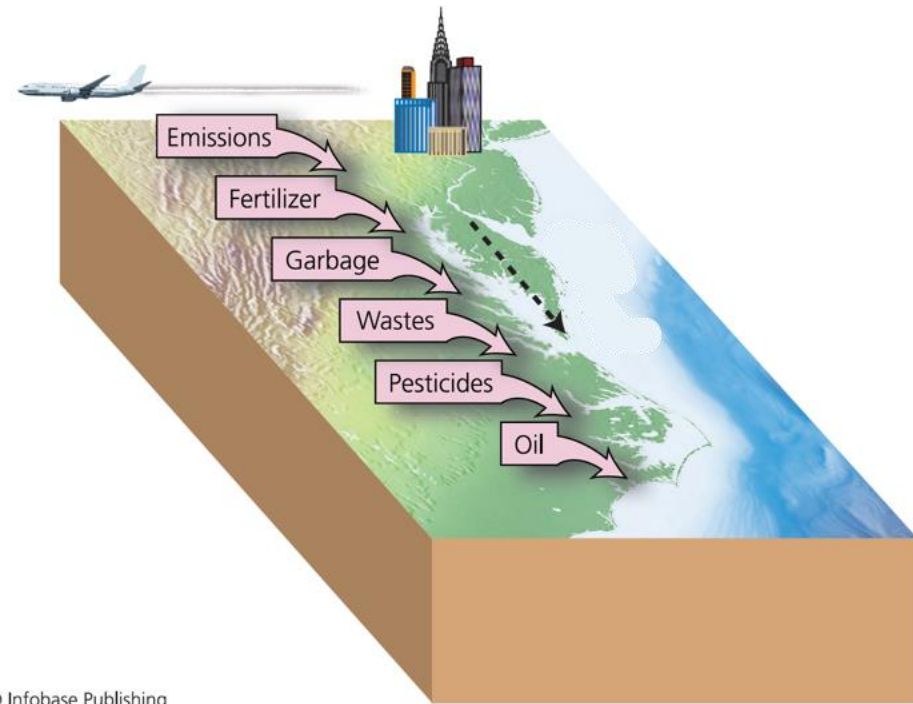
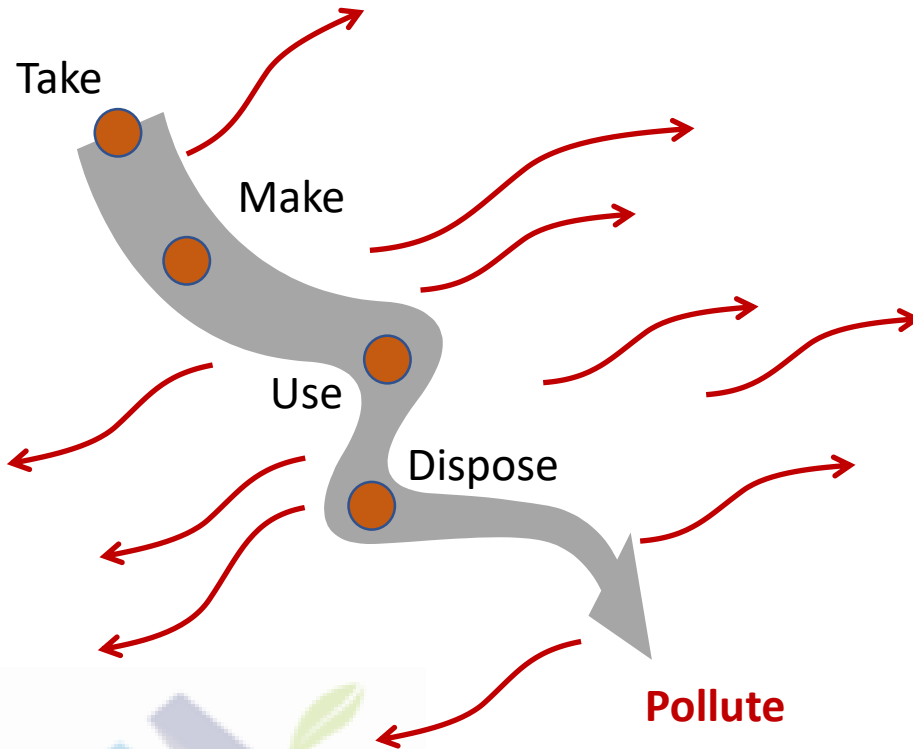
*Human well-being has been steadily improving, while natural ecosystems (from which we derive most goods and services) have been declining.*

- **Consumer-based society**

Adopted **disposable objects as their style** of life as electronics, furnishings, and fashions meet an emotional need which contributes to how quickly things go obsolete.



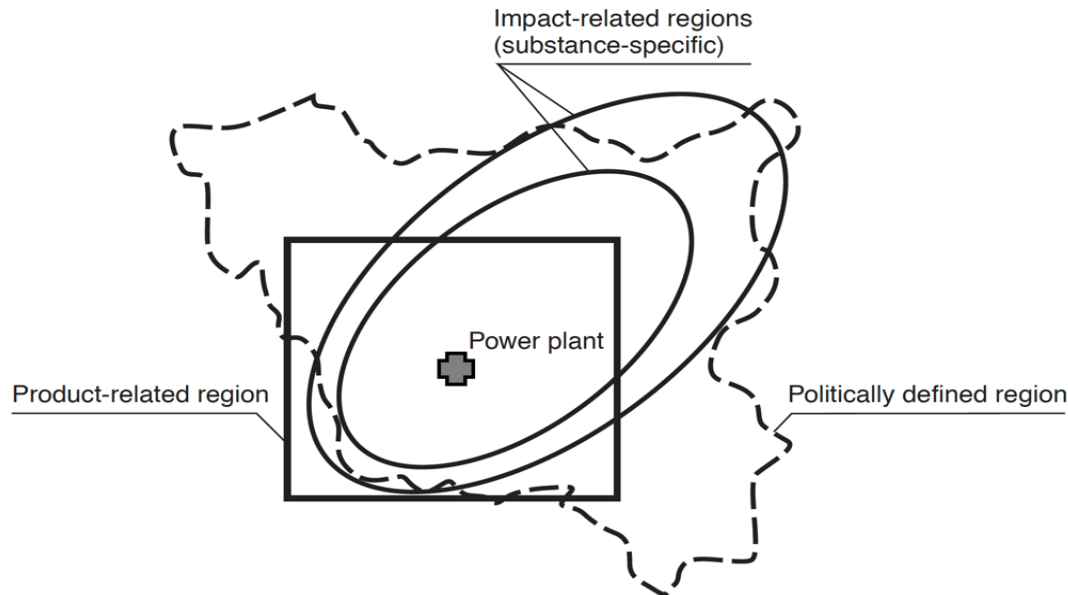
## The “Waste Problem”



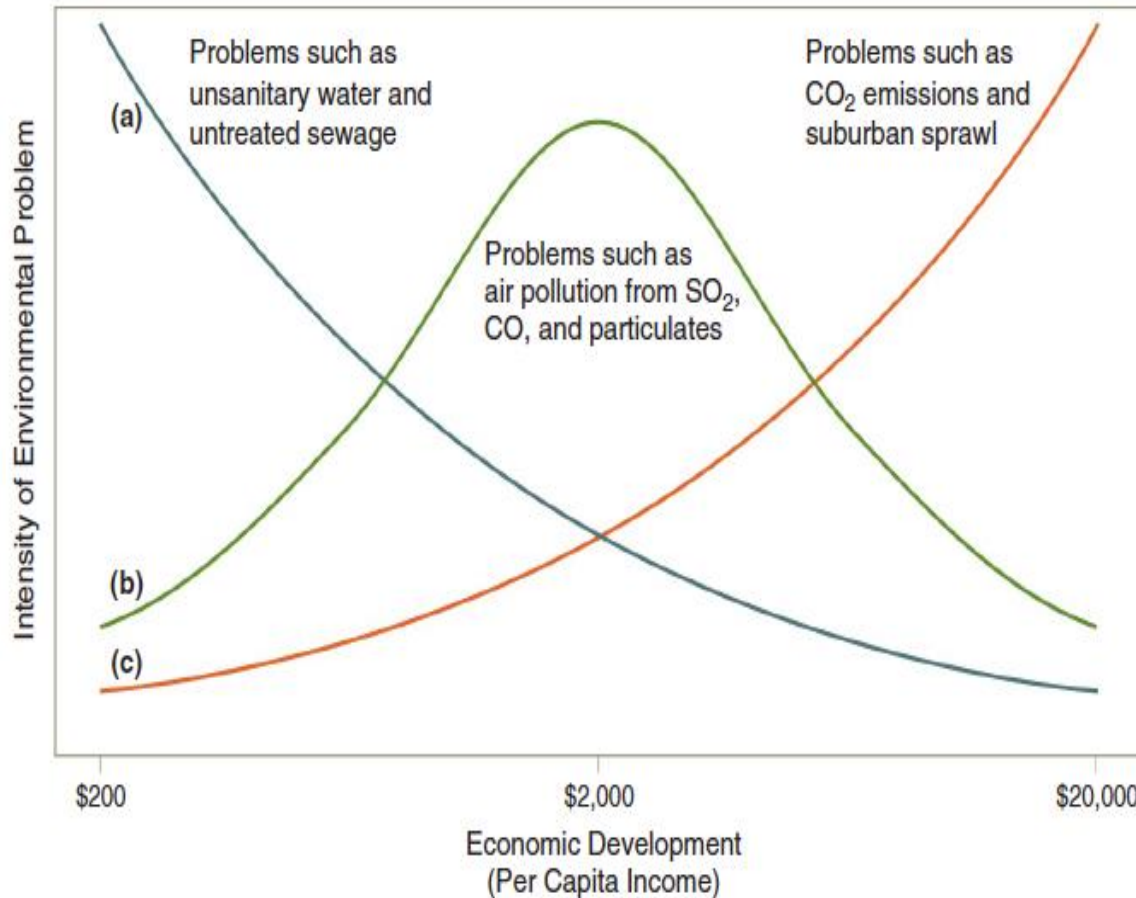
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## The “Global Problem”

Waste is a **global problem** and waste related issues are not related to any particular region or country, but are global in its nature, requiring multidisciplinary, multiorganizational, and multinational educational efforts consideration of the common good.

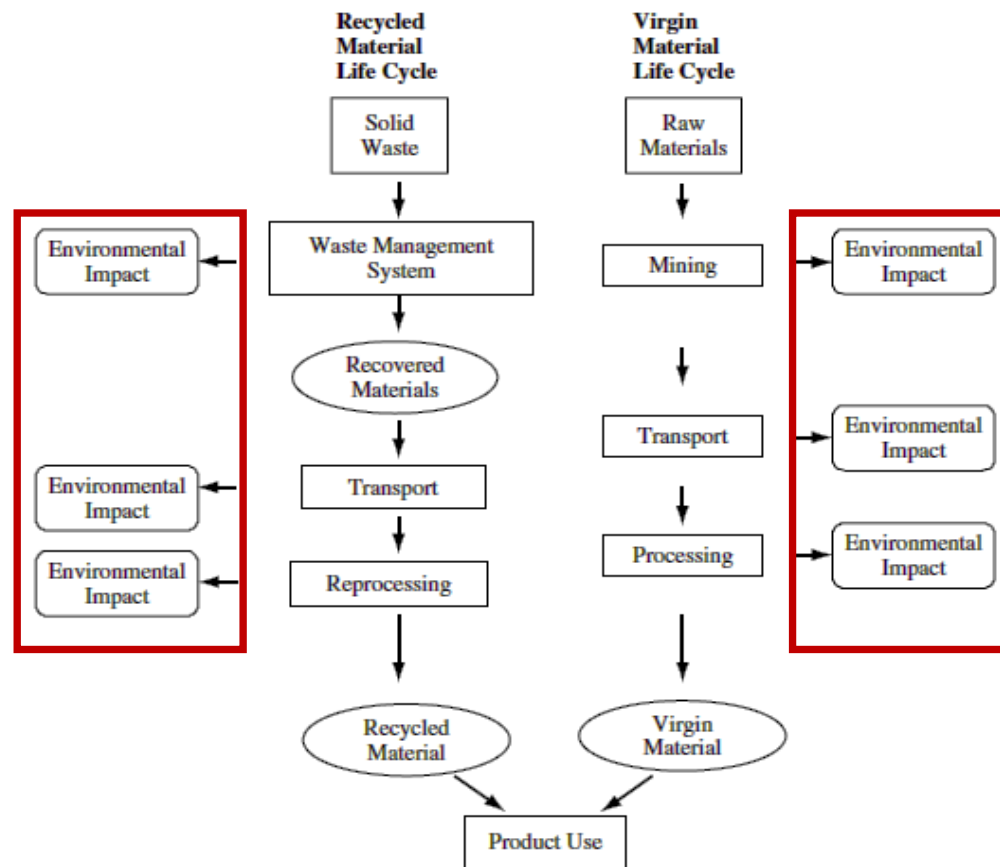


## Environmental problems vs. per capita income



- (a) Some can be improved with income growth,
- (b) Other problems get worse and then improve,
- (c) Some problems just worsen....

## Lifecycle assessment for recycled and virgin materials



## Definition(s).....

Waste occurs from HUMAN daily activities, from different sources: commercial, industrial, municipal, agricultural, health care waste.....



- The term 'waste' has different meanings for different people , one can say that waste is '**unwanted**' for one who discards it.
- But 'unwanted' is subjective and the waste **could have value for another** person in a different circumstance, or even in a different culture.



## Waste Categorisation



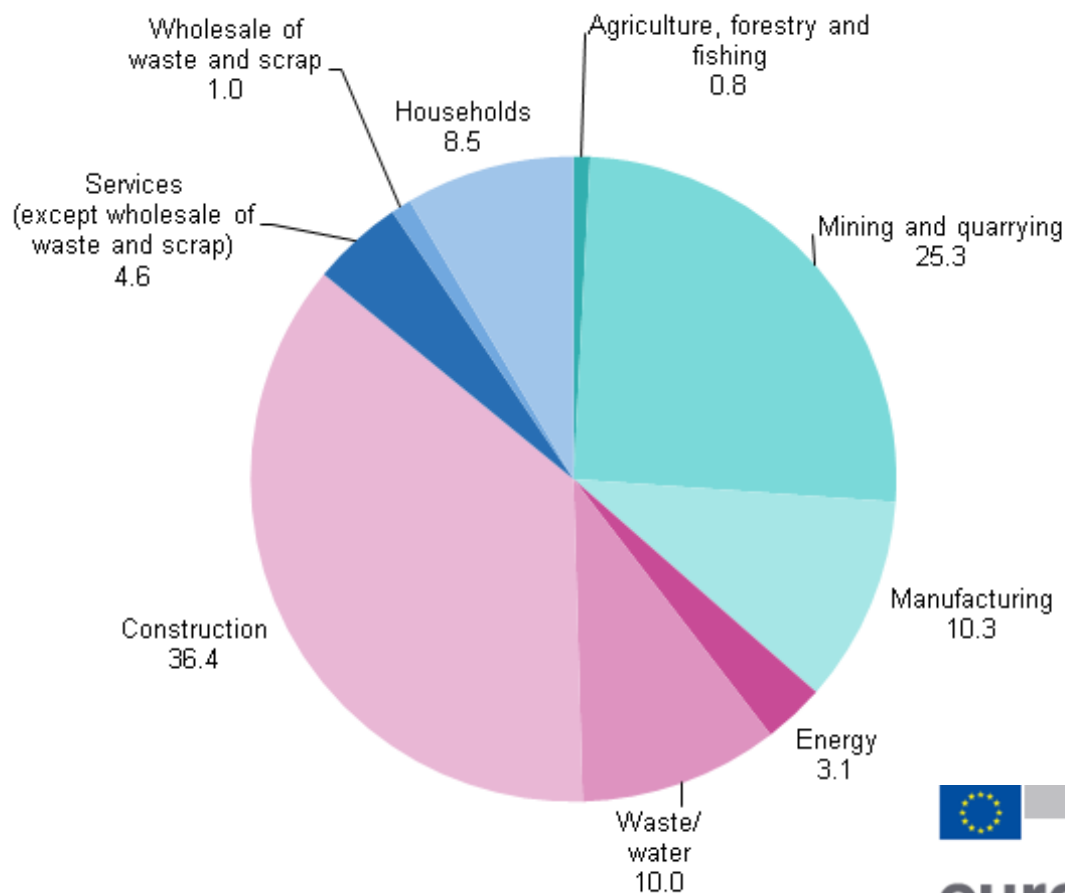
## Waste Categorisation

Type or Source	Description of Contents
<b>Municipal solid waste (MSW)</b>	household, hotels/motel, and business trash and garbage: food scraps, bottles, packaging, paper, newspapers, batteries, yard trimmings, furniture, appliances, clothing, and toys
<b>Environmentally regulated hazardous waste</b>	hazardous substances monitored by the environmental law(s), substances that are toxic, reactive,, or causing or contributing to the development of a disease
<b>Radioactive waste</b>	any solid, semisolid, or liquid waste containing radioactive elements
<b>Wastes from extraction industries</b>	wastes from mining and mineral processing: metals,
<b>Industrial non hazardous waste</b>	excess materials from manufacturing or energy production: pulp and paper, iron and steel, glass, plastics, and concrete
<b>Household hazardous waste</b>	household items containing chemicals: paints, stains, varnishes, solvents, cleaning chemicals, and pesticides

# Waste Categorisation, continued

Type or Source	Description of Contents
<b>Agricultural waste</b>	animal waste from livestock, dairies, other farm animals and wastes from crop production and harvesting: manure, feed, used bedding, animal by products, carcasses, crop discards such as leaves, vines, twigs, branches, and weeds
<b>Construction/ demolition waste</b>	debris from construction, renovations, or demolitions: wood, concrete, brick, steel and other metals, glass, drywall, plaster, and insulation
<b>Medical waste</b>	solids generated in diagnosis, treatment, or immunization of humans or animals and from clinical, research, or manufacturing settings: unused drugs, needles, syringes, bottles and tubing, bandages, wraps, bedding, medical and dental devices, and protective clothing
<b>Oil and gas industry waste</b>	solids and liquids produced in exploration, drilling, waste and production of crude oil or natural gas
<b>Sludge</b>	solid, semisolid, or liquids from wastewater treatment
<b>Dredging waste</b>	solids and semisolids removed from the bottom of rivers or harbours
<b>Sewage</b>	household or industrial wastewaters discharged into sewers
<b>Transportation</b>	fuel, lubrication, chemicals, tires, vehicles, food, seating, furniture, electronics
<b>E-waste</b>	Waste electrical and electronic equipment

## Waste generation by economic activities and households, EU 2016 (%)



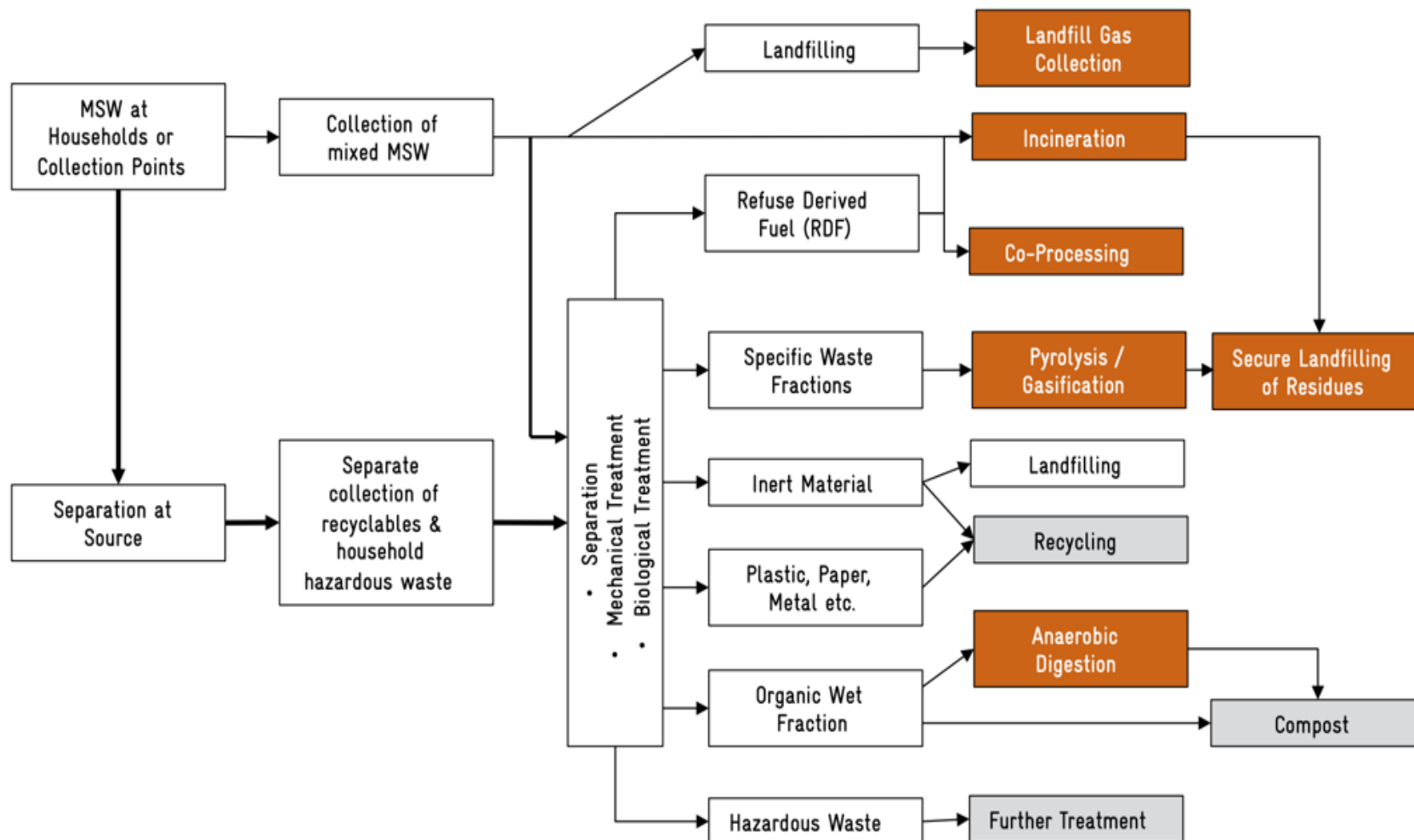


## Waste Management Systems / Flowcharts

## Elements of a Solid Waste Management System

Waste generation
Waste handling and initial separation, storage, and processing at the source
Collection
Transfer and transport
Separation, processing, and transformation of solid waste
Disposal

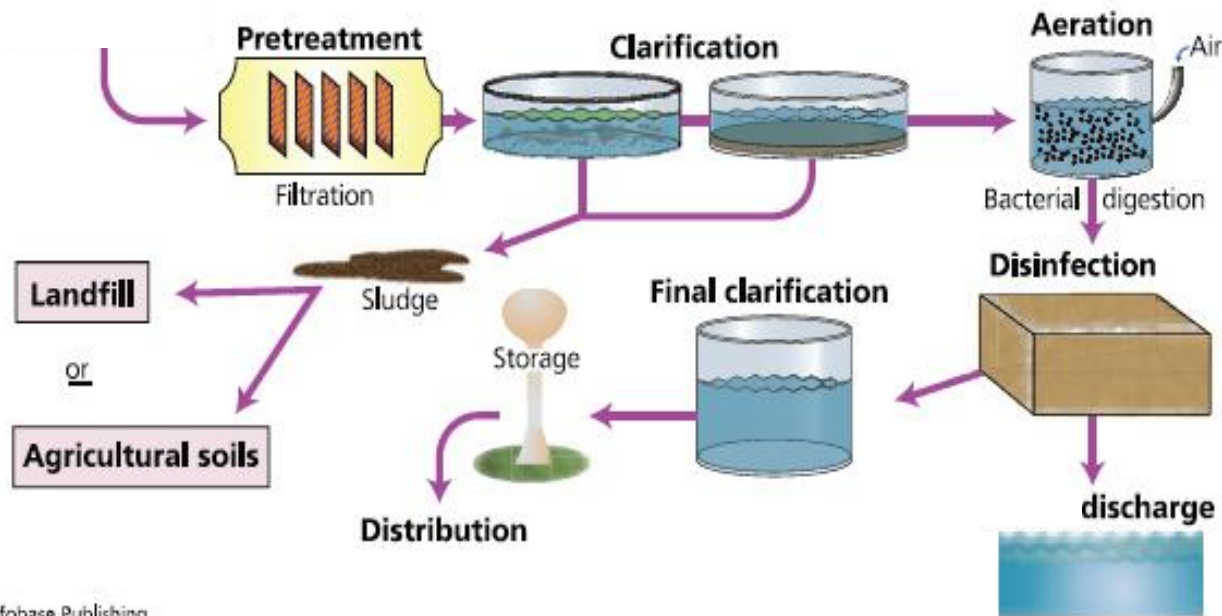
## Overview of MSW material flow and its different utilisation and treatment options



## Elements of a Liquid Waste Management System

Generation
Collection
Transmission
Treatment
Reuse/disposal
Receiver

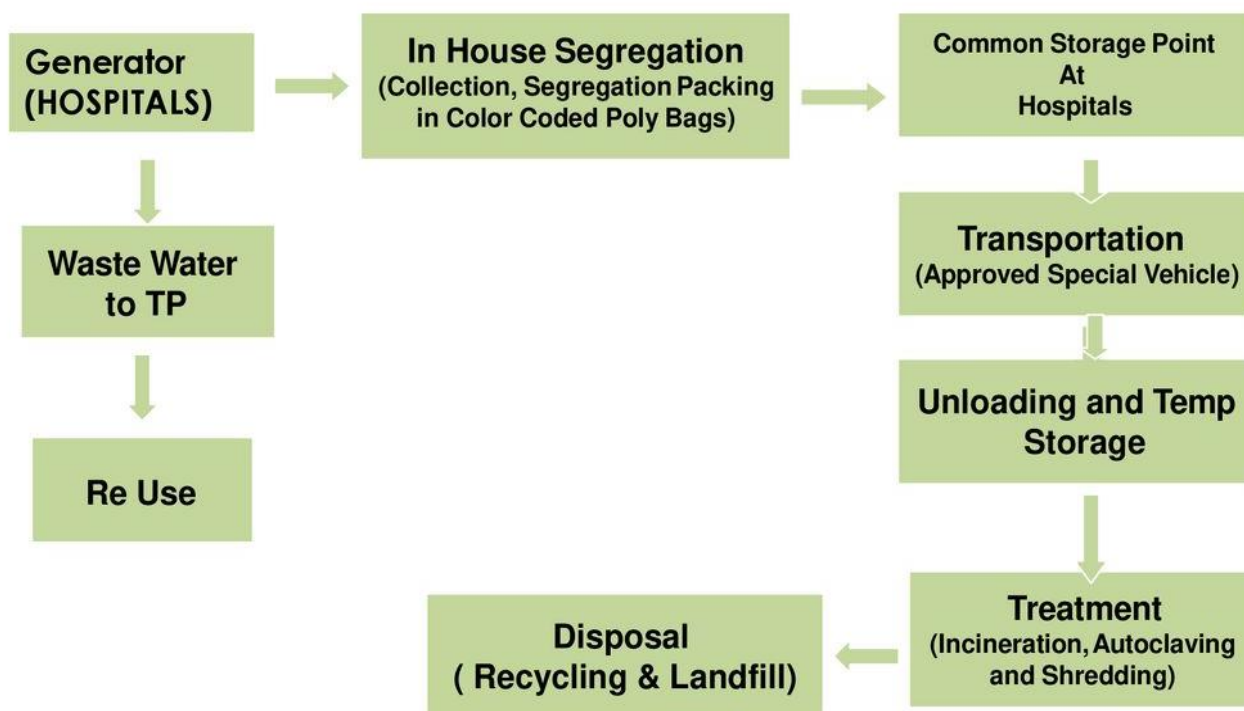
## Overview - wastewater treatment



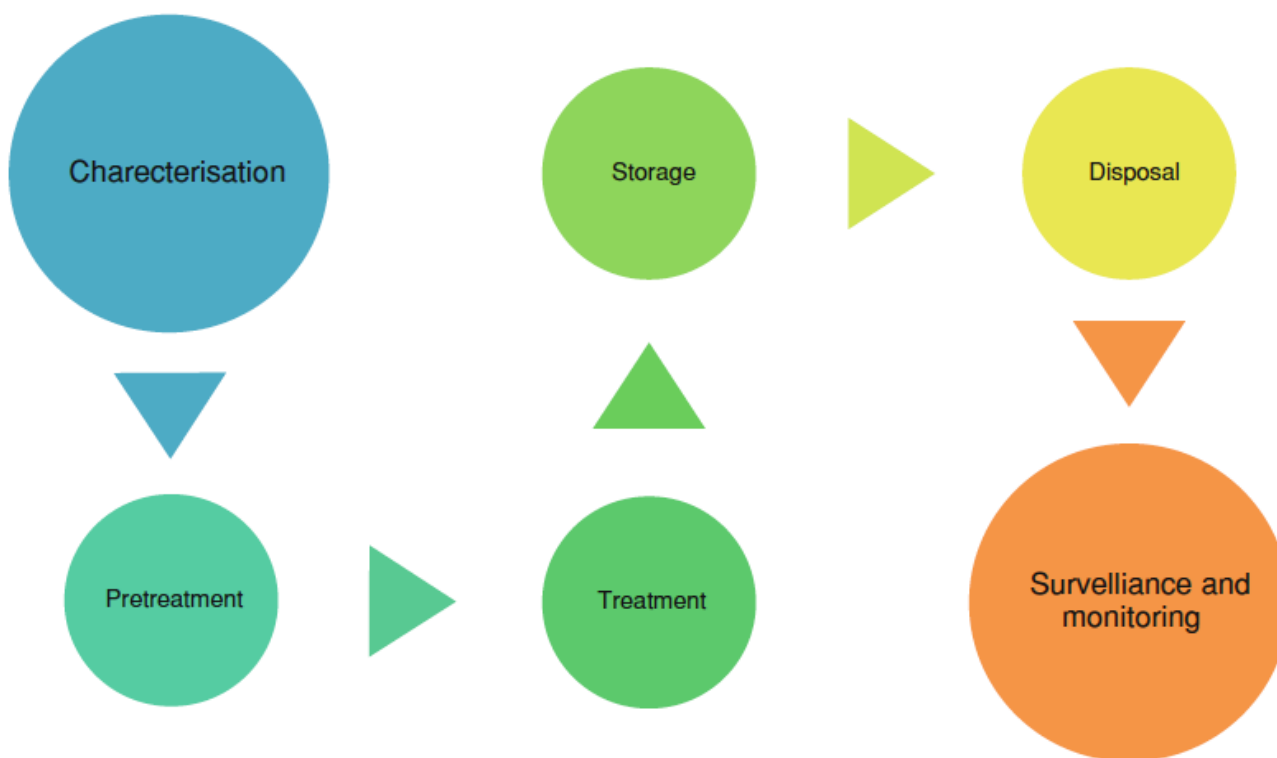
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Municipal wastewater treatment typically comprises a string of physical, chemical, and biological processes aimed at the removal of the polluting load and the production of a final product that can safely be disposed of in watercourses and/or reused..

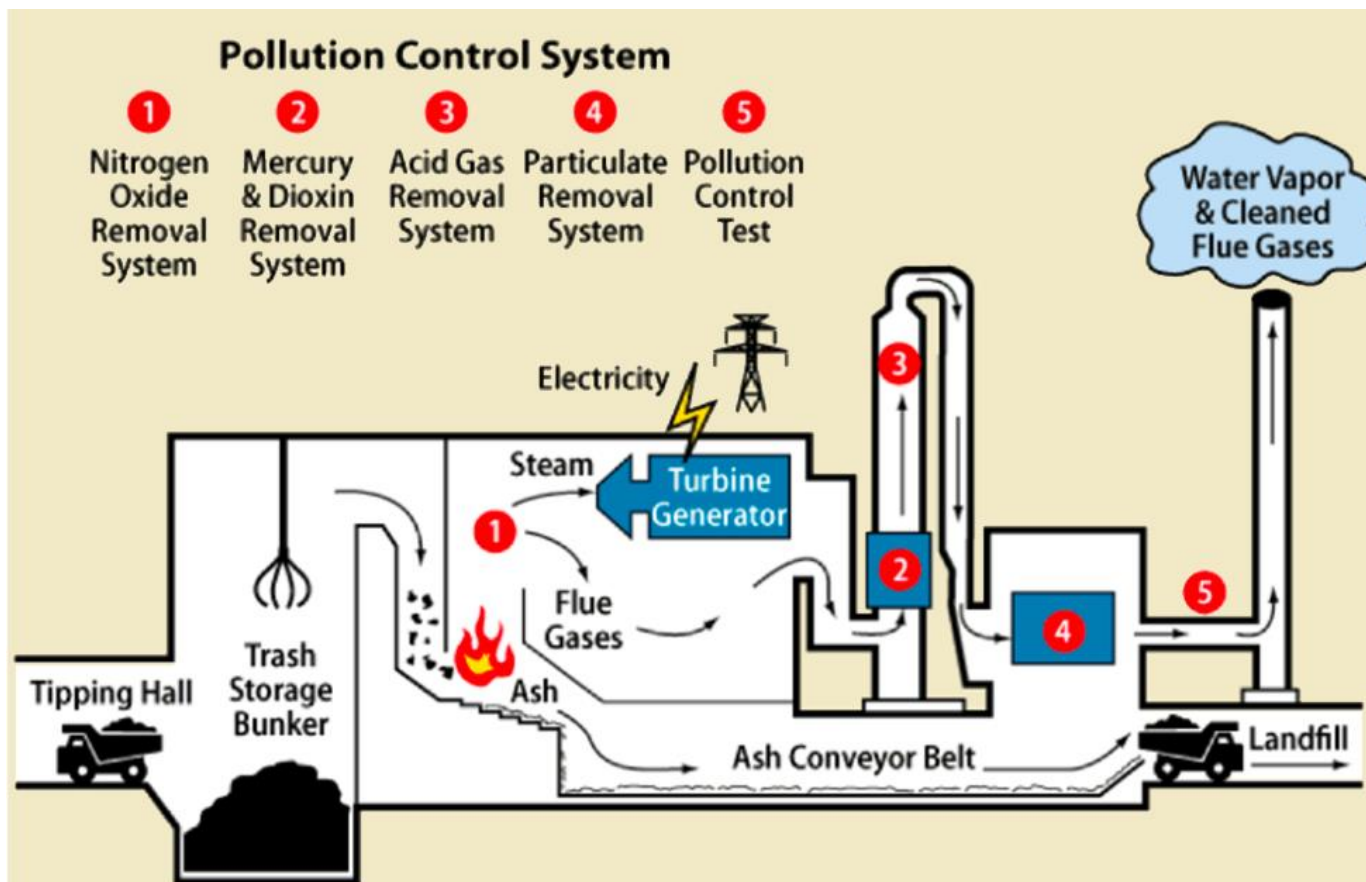
## BIO-MEDICAL WASTE FLOW CHART



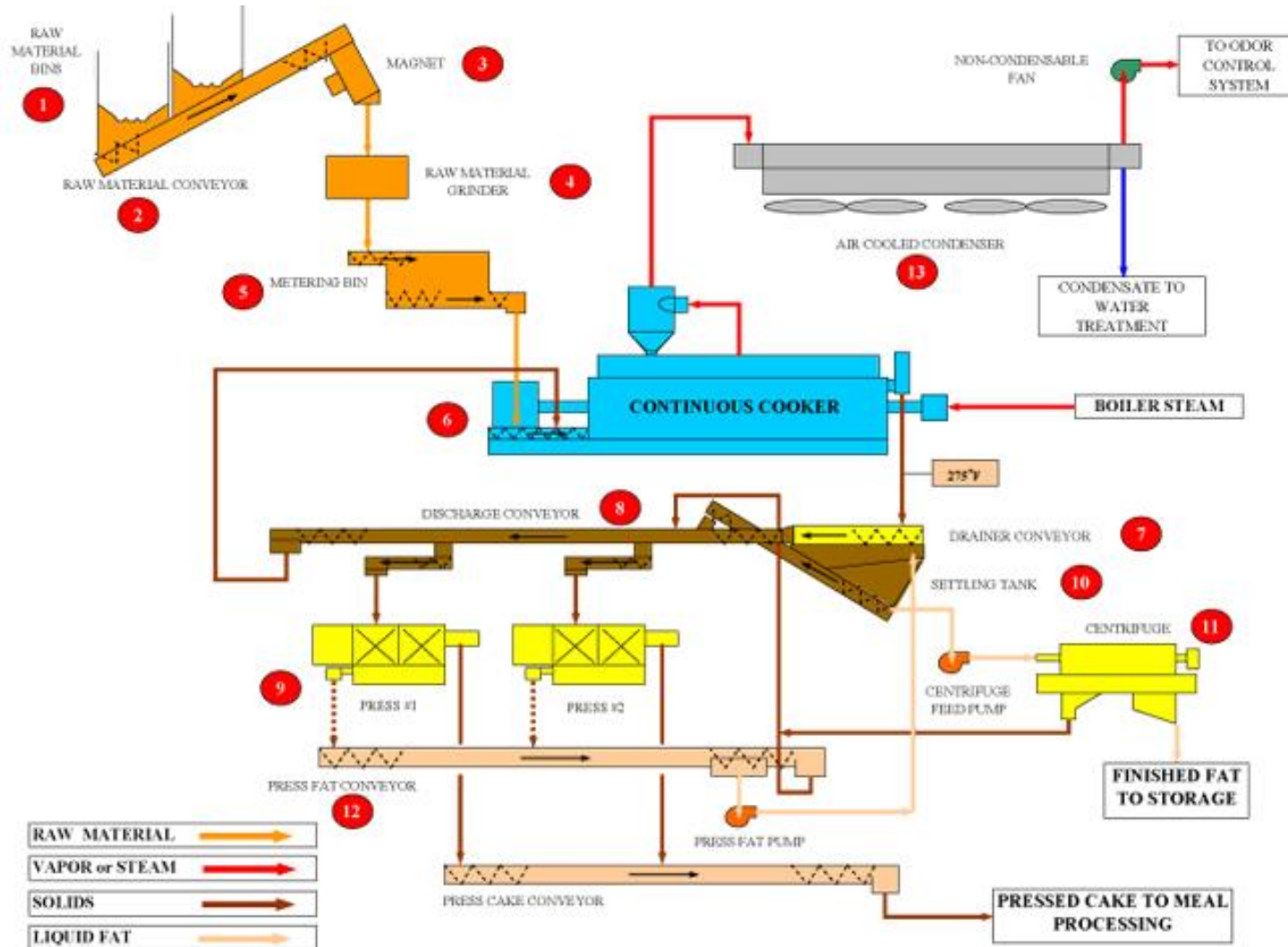
## Stages of managing radioactive waste



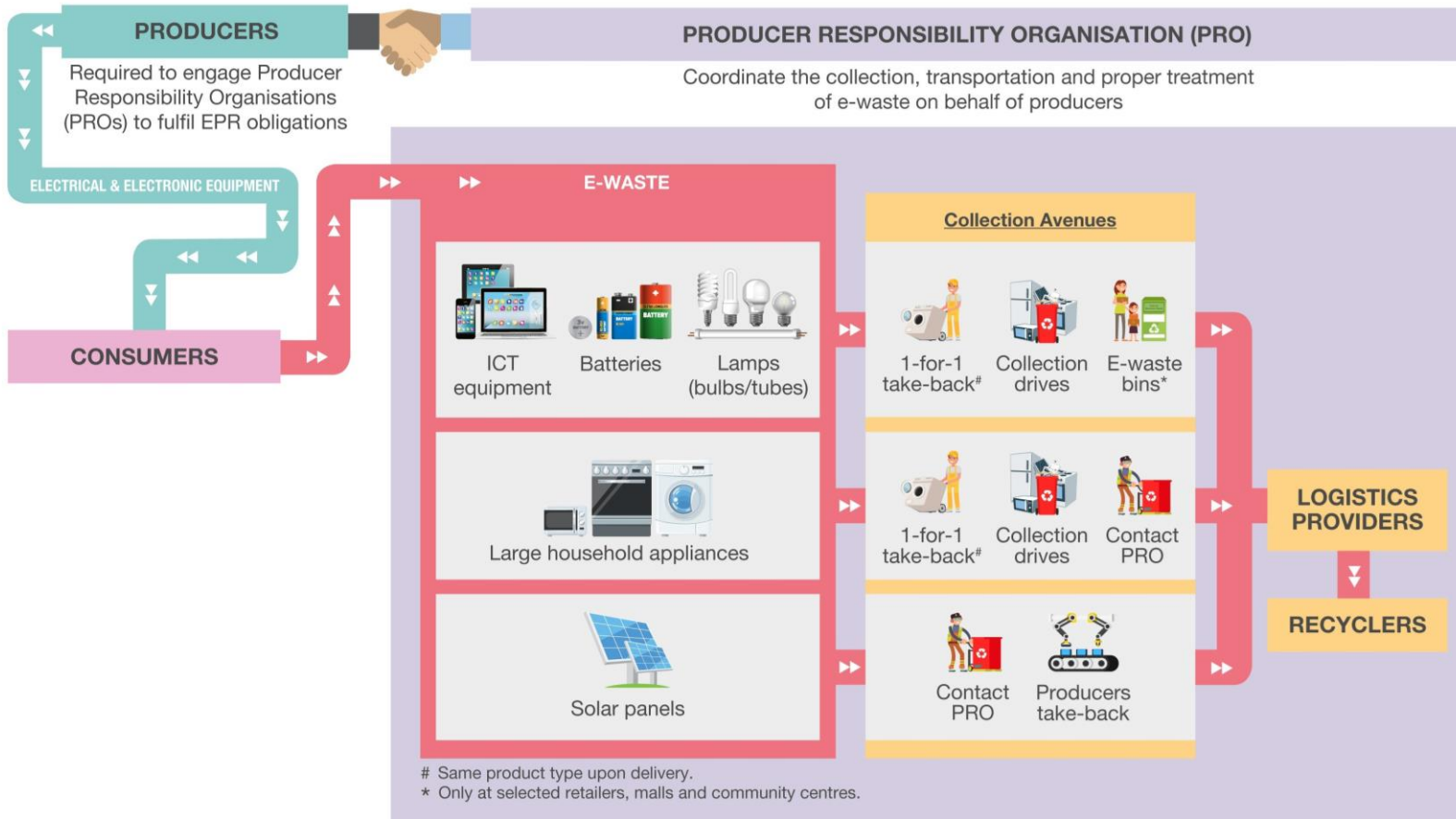
## Waste to Energy



## Animal By products Rendering process



## E-waste management

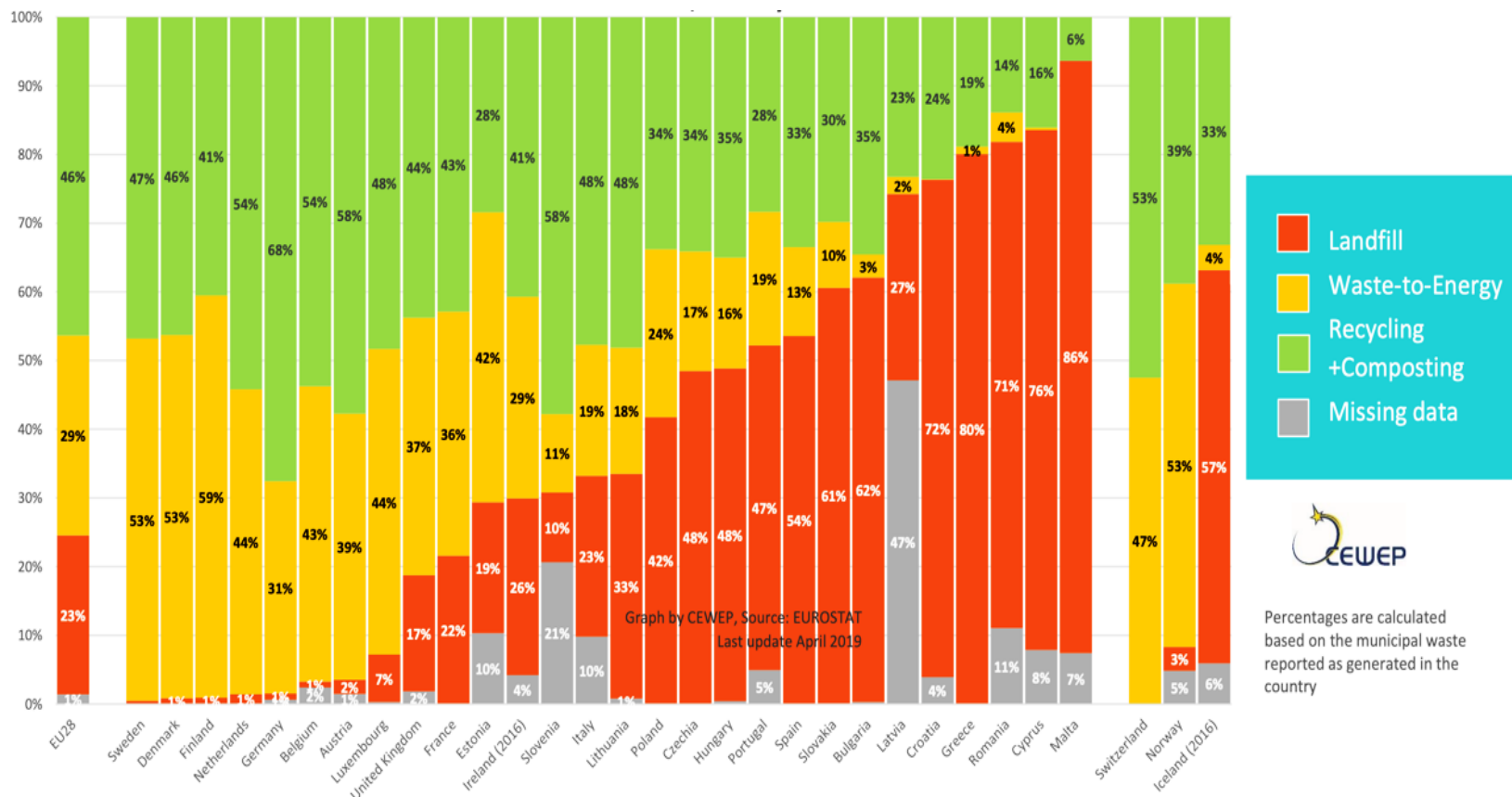




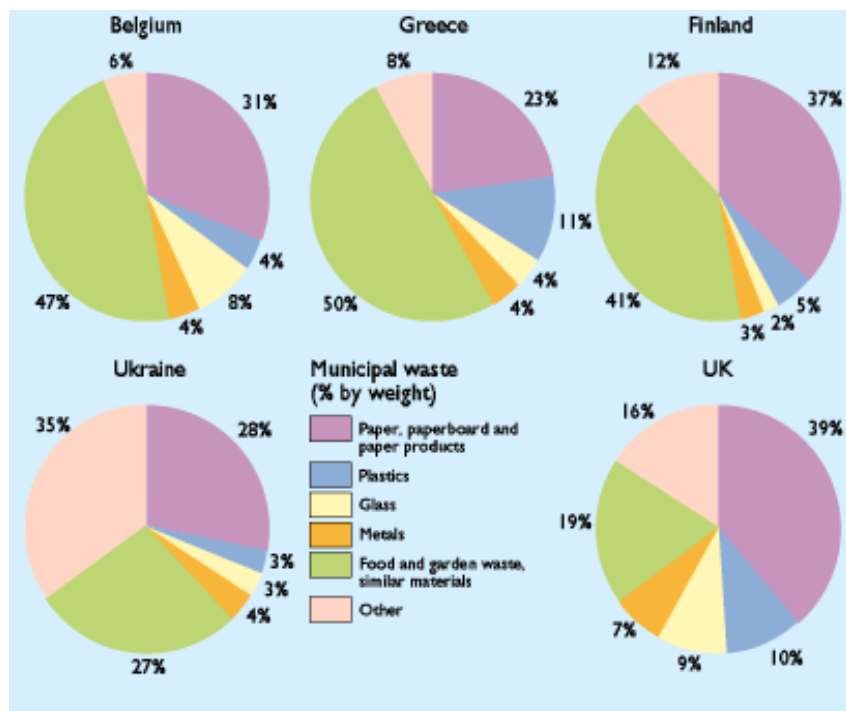
## Waste Treatment/Composition Examples



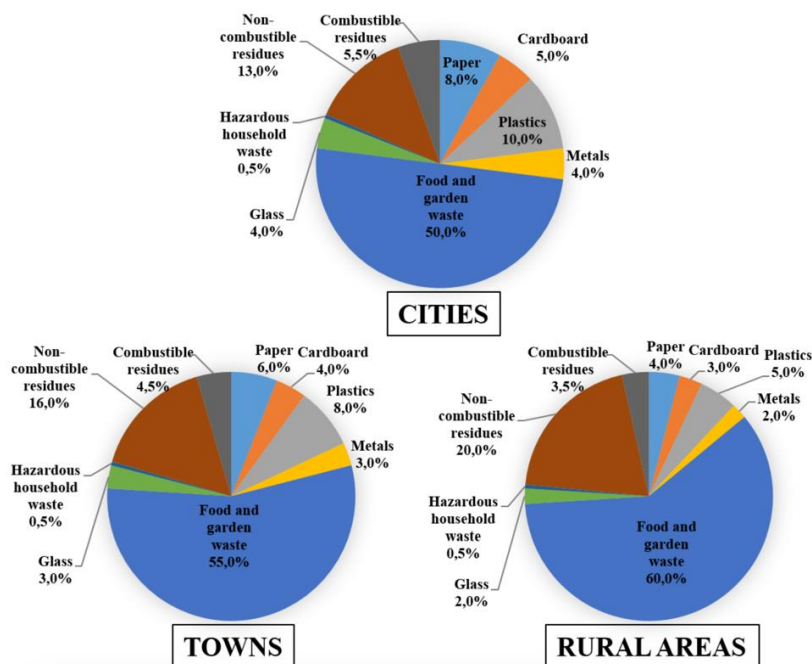
## MSW Treatment in 2017



## MSW Composition

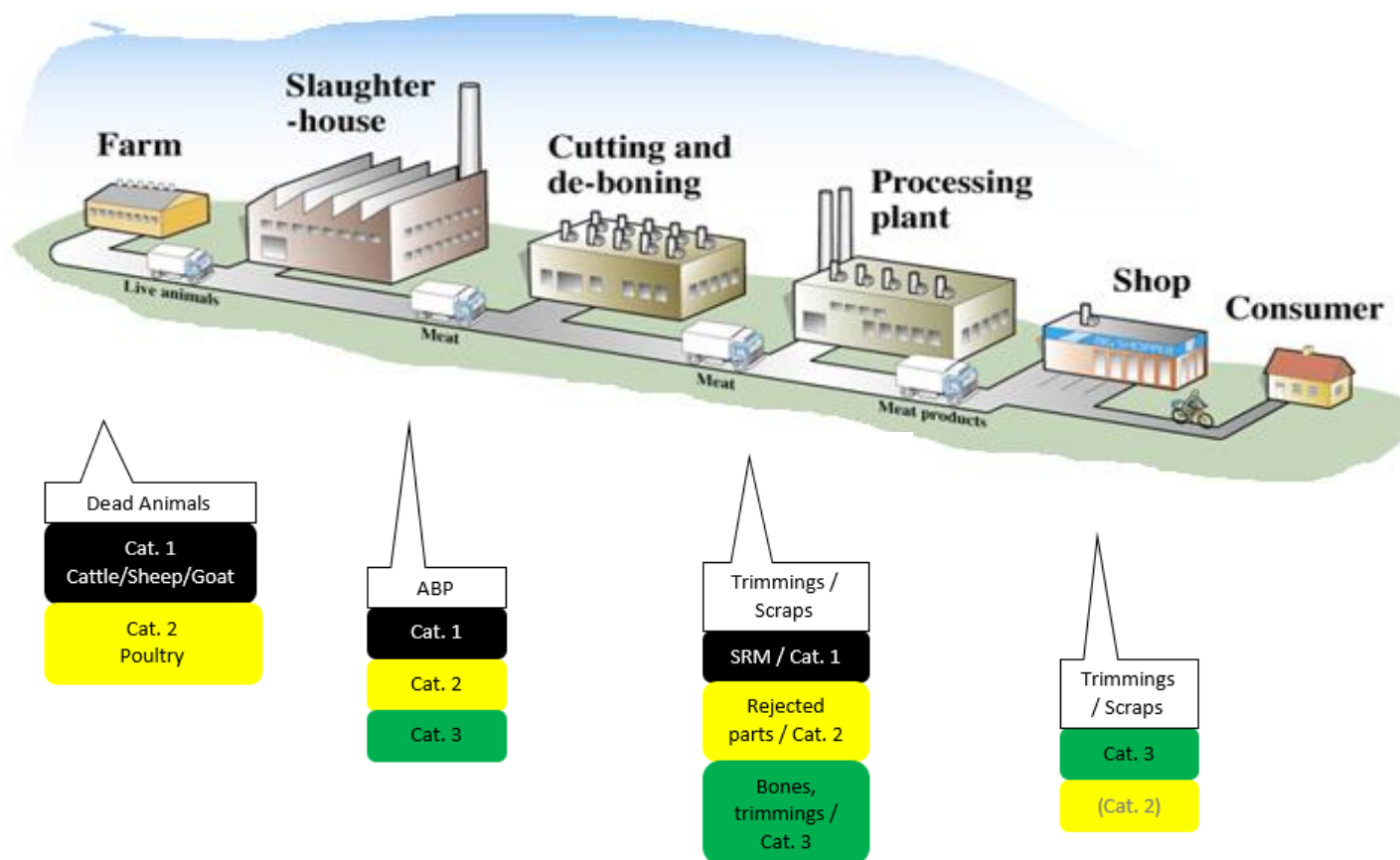


Country example



Locale example - Turkey

## Animal by Products Composition at source



# Sustainability



## Waste Hierarchy

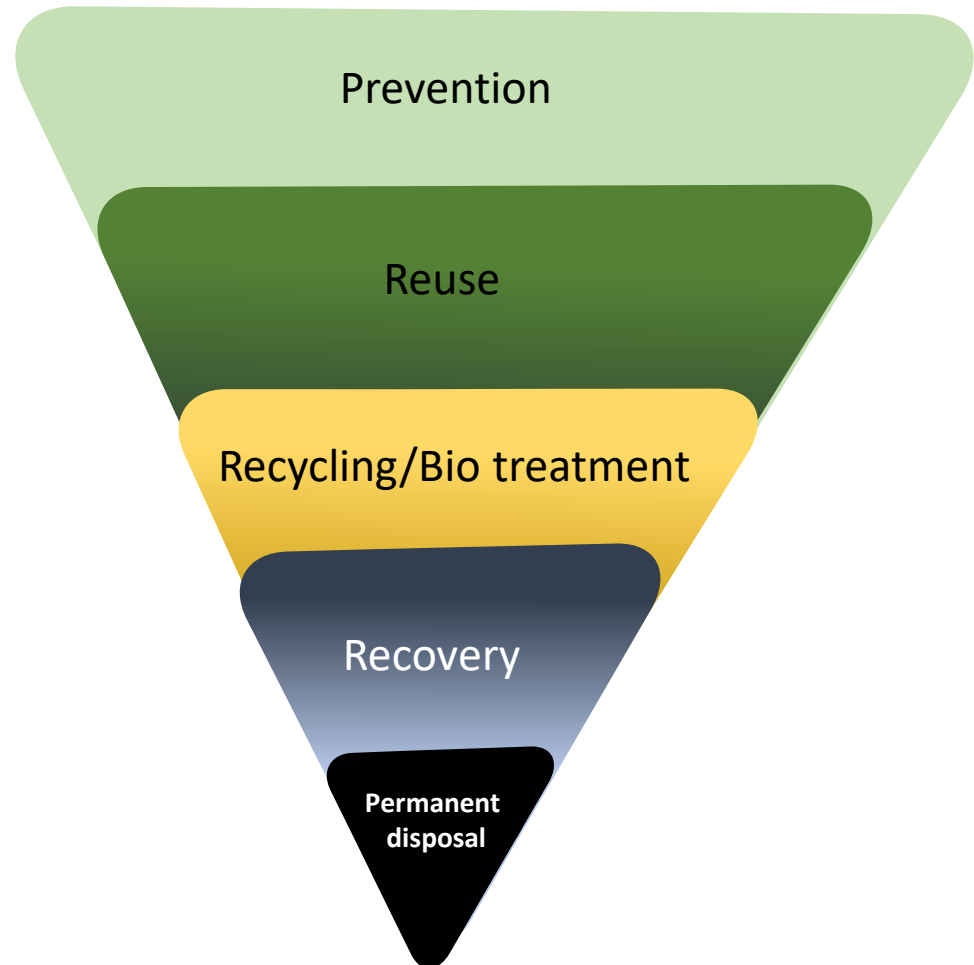
Waste Prevention is the most sustainable form of waste management as it minimises the generation of waste products right from the source. It often results in the least environmental and economical life cycle costs.

The re-use of waste refers to the continued use of items for which they were initially intended (checking, cleaning repairing and/or refurbishing products or parts.....)

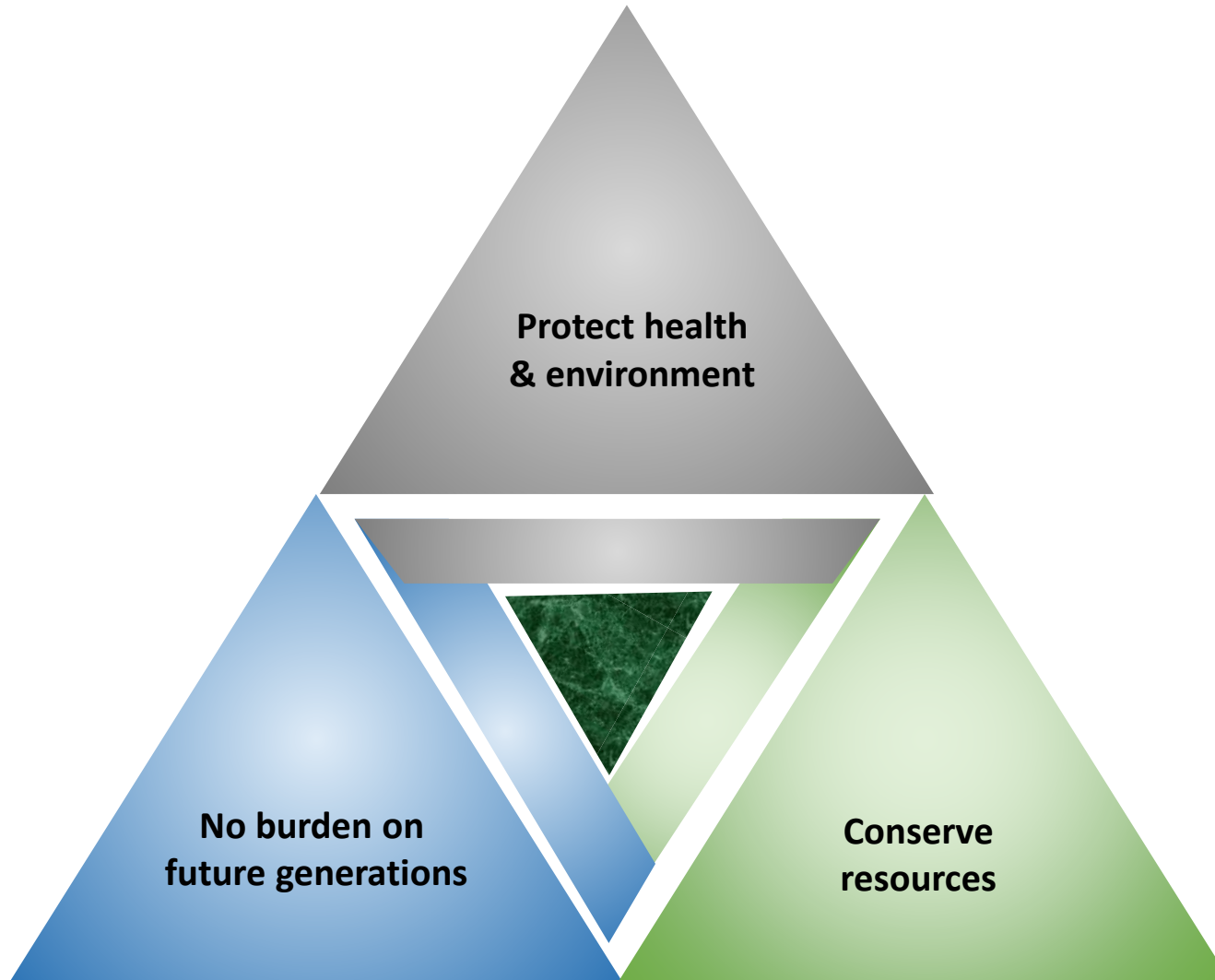
Recycling refers to the collection of used, reused or unused items, otherwise considered waste and turning them back into raw materials, ready to be used for another product

Waste to Energy / Recovery of materials

Disposal of waste is the least favourable options, last resort in sorting of waste. Disposal, such as landfill, should only be considered once all other options have been explored and dismissed.



## Sustainable development and waste management principles





WAY  
ORWARD

## “Integrated” waste management system fundamentals

### *Environmental aspects*

land, water and air, focus not on the ‘**standard of living**’ but on the ‘**quality of life**’

### *Political/legal aspects*

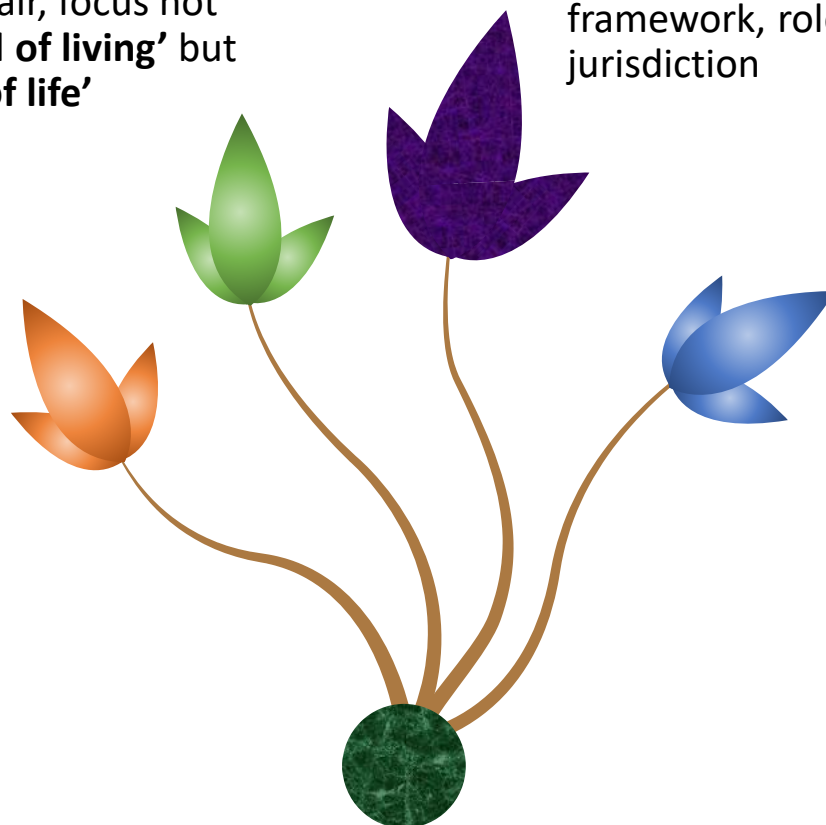
legal and regulatory framework, roles and jurisdiction

### *Financial-economic aspects*

budgeting, cost accounting and income generation

### *Institutional – Social-cultural aspects*

Control and implementation of available institutional capacities (private and public), influence of culture on waste generation in the household and in businesses and institutions



## Sustainable management of natural resources and waste

Establishing a strategy for the recycling of waste



- the improvement of existing waste management schemes;
- investment into waste prevention and integration of waste prevention into other EU policies and strategies;
- ensuring that waste is recovered or disposed of without endangering human health and without using processes or methods which could harm the environment;
- establishing an integrated and adequate network of waste disposal installations, taking account of the best available technology but not involving excessive costs;
- ensuring self-sufficiency in waste disposal;
- encouraging the prevention or reduction of waste production and its harmfulness by the development of clean technologies;
- encouraging the recovery of waste by means of recycling, re-use or reclamation, and the use of waste as a source of energy.

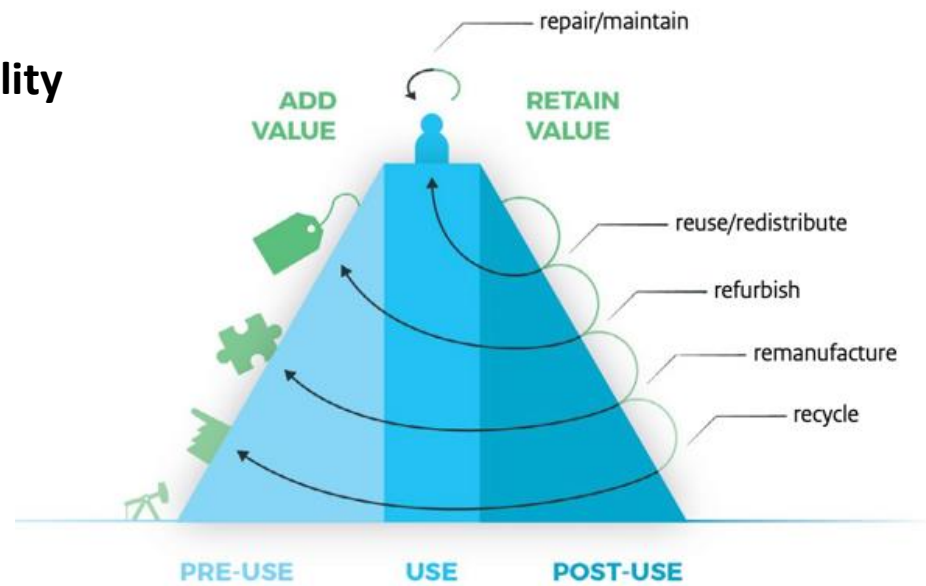


## Sustainable management of natural resources and waste.....

Legislation driven design meets recycling

### EXAMPLE:

- design for disassembly
- design for longevity
- design for repairability and recyclability
- design for modularity



Sustainable waste management development contributes to **job creation** in the sector itself and encourages services and products in other sectors and industries

## JOB OPPORTUNITIES

- Cleaner production,
- Industrial efficiency,
- Design for environment
- Open-spaces cleaning (e.g. clearing of illegal dumping sites, street cleaning and sweeping, litter picking)
- Waste and recyclable collection and sorting - Recycling and recovery –
- Reuse, refurbishment and repair of goods, e.g. appliances
- Dismantling, refurbishment, Reuse
- Waste-to-energy processing
- Landfill operation
- Production of compost for agriculture

*According to the latest Eurostat data, the waste and recycling sectors in the EU provide jobs for nearly 1 000 000 workers. This represents about 0.4% of all jobs in the EU as a whole*

## Sustainable waste management **GREEN JOBS** opportunities

Asbestos Analyst Jobs	Asbestos Consultant Jobs	Asbestos Jobs	Asbestos Manager Jobs
Asbestos Officer Jobs	Asbestos Operative Jobs	Asbestos Project Manager Jobs	Asbestos Removal Jobs
Asbestos Removal Operative Jobs	Asbestos Supervisor Jobs	Asbestos Surveying Jobs	Asbestos Surveyor Jobs
Asbestos Testing Jobs	Biomass Jobs	Contaminated Land Jobs	Electronic Recycling Jobs
Energy from Waste Jobs	Environmental Waste Jobs	Graduate Waste Management Jobs	Hazardous Waste Disposal Jobs
Hazardous Waste Jobs	Hazardous Waste Management Jobs	Hazardous Waste Removal Jobs	Industrial Waste Management Jobs
Landfill Gas Jobs	Medical Waste Jobs	Metal Recycling Jobs	Nuclear Waste Disposal Jobs
Nuclear Waste Jobs	Pollution Jobs	Radioactive Waste Jobs	Recycling Centre Jobs
Recycling Coordinator Jobs	Recycling Driver Jobs	Recycling Industry Jobs	Recycling Jobs
Recycling Management Jobs	Recycling Manager Jobs	Recycling Officer Jobs	Recycling Operative Jobs
Recycling Plant Jobs	Recycling Sales Jobs	Recycling Sorter Jobs	Recycling Specialist Jobs
Solid Waste Jobs	Solid Waste Management Jobs	Waste and Recycling Jobs	Waste Collector Jobs
Waste Company Jobs	Waste Consultant Jobs	Waste Disposal Jobs	Waste Driver Jobs
Waste Energy Jobs	Waste Industries Jobs	Waste Jobs	Waste Management Consultant Jobs
Waste Management Customer Service Jobs	Waste Management Driver Jobs	Waste Management Engineering Jobs	Waste Management Jobs
Waste Management Officer Jobs	Waste Management Sales Jobs	Waste Manager Jobs	Waste Officer Jobs
Waste Recycling Jobs	Waste Refuse Jobs	Waste Removal Jobs	Waste Sales Jobs
Waste to Energy Jobs	Wastewater Jobs		

## Sustainable waste management - Cost and Incentives

Proper sustainable waste management systems may appear expensive compared to the **less visible costs** of poor waste management, yet **justifiable** compromises between costs and social benefits (*i.e. job creation, added value, mitigating environmental negative impacts, alleviating health risks and improving the quality of life*) are needed.

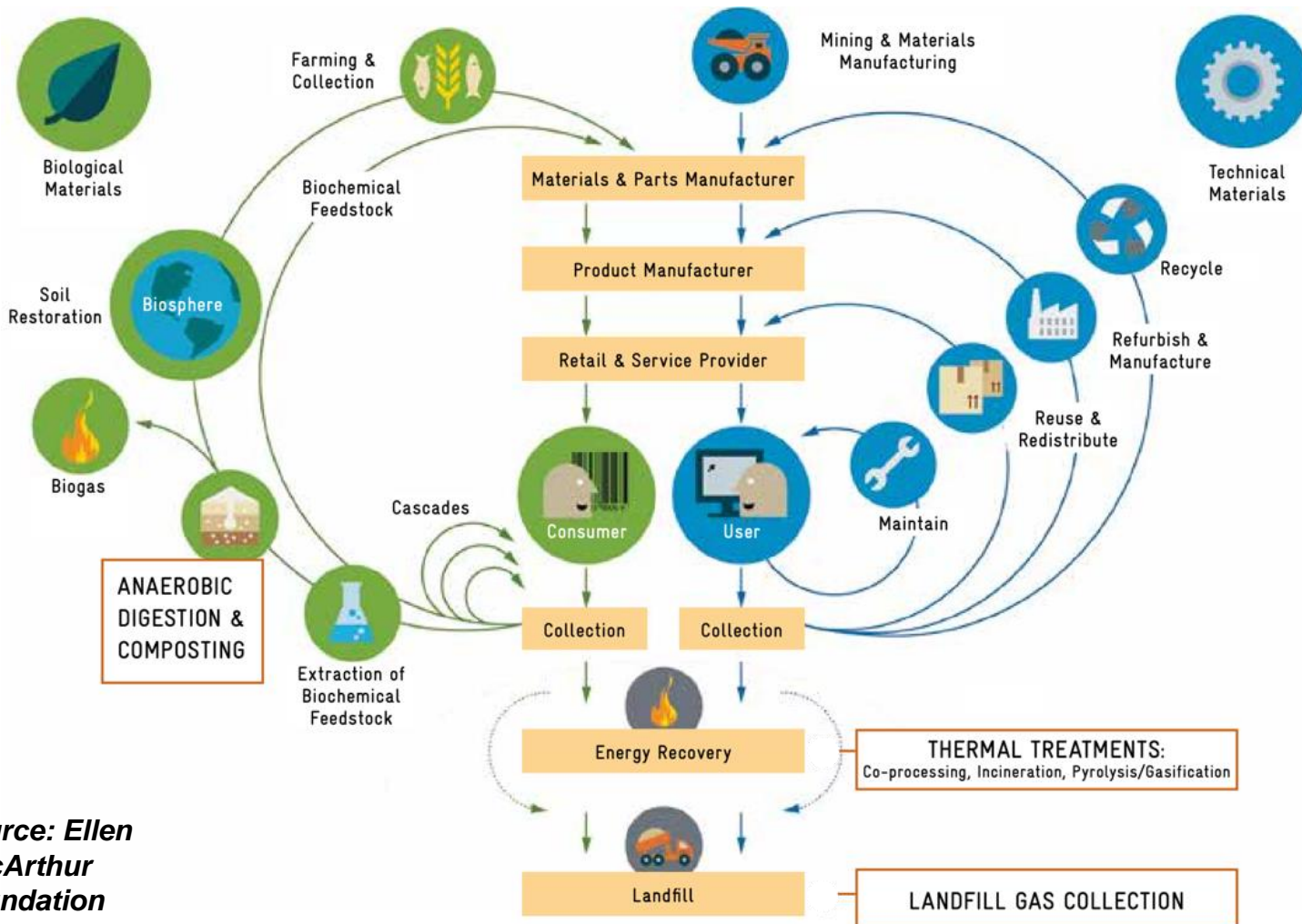
The incentives in the waste sector include:

- 1) Taxes and fees;
- 2) Recycling credit and other forms of subsidies;
- 3) Deposit – refund; and/or Performance bond or environmental guarantee funds.

Samples:

- ***The polluter pays principle***—charging polluters according to the volume and kind of waste generated.
- ***Users-pays principle*** – paying users of waste
- ***Pays-as-you-throw*** discourages waste generation.
- Use of ***landfill taxes at proper levels*** or ***landfill disposal bans*** on certain materials

## Sustainable waste management - aim for **Circular Economy**



**Source: Ellen  
MacArthur  
Foundation**

# THANK YOU



## Partners:



## Sponsor:



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