Waste Management

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Introduction.....

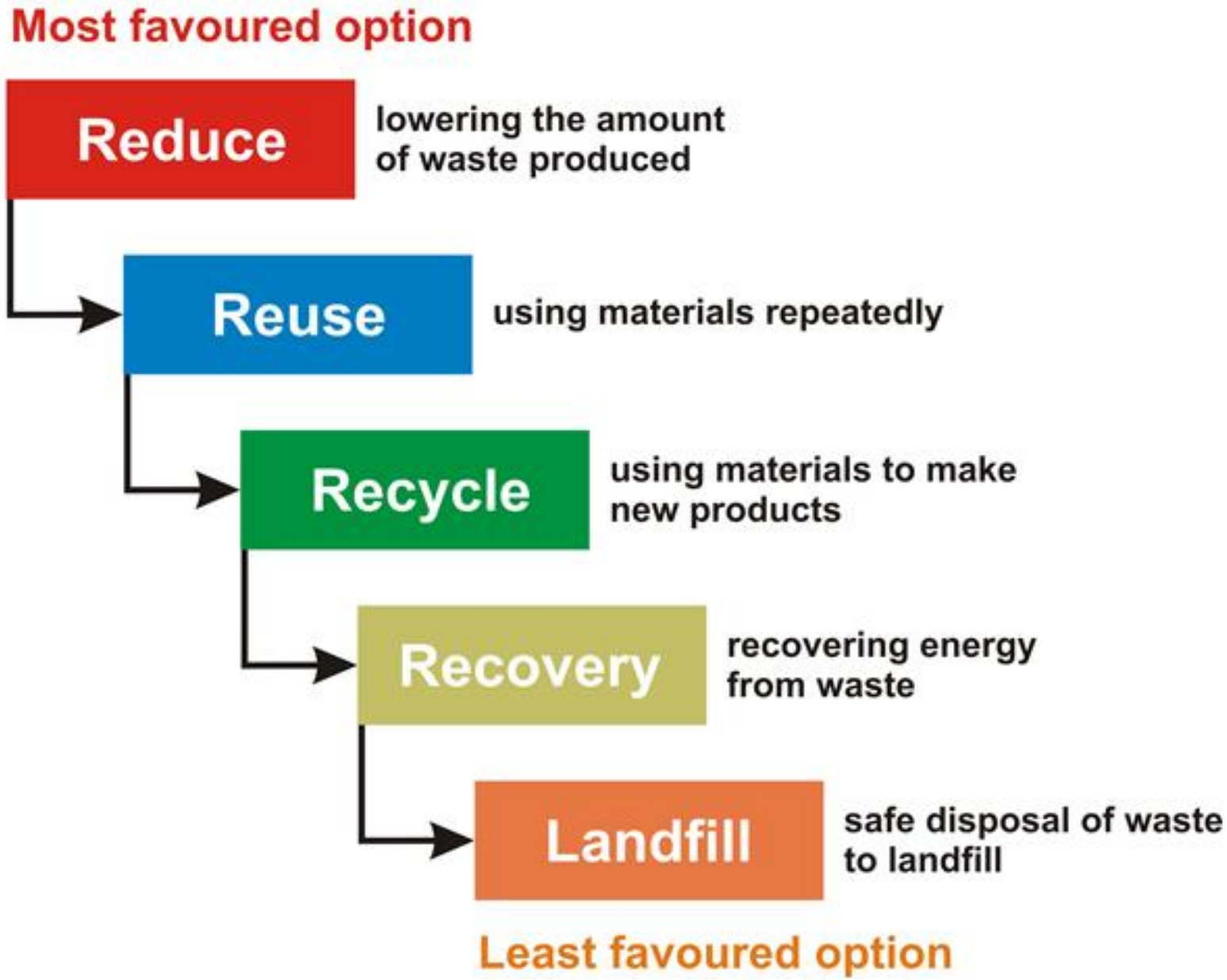
Industrialized nations are grappling with the problem of expeditious and **safe waste disposal**. Non-biodegradable and toxic wastes like radioactive remnants can potentially cause irreparable damage to the environment and human health if not strategically disposed of.

Though waste disposal has been a matter of concern for several decades, the main problem has been taking massive proportions due to growth in population and industrialization, the two major factors that contribute to waste generation. Though **some advancement is being made** in **waste disposal methods**, they are still not adequate. The challenge is to detect newer and unhazardous methods of waste disposal and put these methods to use.

What is waste management?

Waste management is a process that combines all the activities necessary for managing waste – collection of garbage, transportation, and disposal of the trash. Its primary purpose is to lessen the waste of unusable materials and avoid potential environmental and health risks.

The waste can be in any form – liquid, solid, gas – but with the help of waste management processes, each state has its own disposal methods. It offers a variety of solutions to recycle the waste, which ultimately leads down to finding ways to recycle it as a valuable resource.


Most favoured option
Reduce
lowering the amount of waste produced
Reuse
using materials repeatedly
Recycle
using materials to make new products
Recovery
recovering energy from waste
Landfill
safe disposal of waste to landfill
Least favoured option


most favoured option
least favoured option
prevention
minimisation
reuse
recycling
energy recovery
disposal

Kinds of Wastes

Solid wastes: **wastes in solid forms, domestic, commercial and industrial wastes**

Examples: *plastics, styrofoam containers, bottles, cans, papers, scrap iron, and other trash*

Liquid Wastes: **wastes in liquid form**

Examples: *domestic washings, chemicals, oils, waste water from ponds, manufacturing industries and other sources*

Classification of Wastes according to their Properties

Bio-degradable

can be degraded (paper, wood, fruits and others)

Non-biodegradable

cannot be degraded (plastics, bottles, old machines,cans, styrofoam containers and others)

Classification of Wastes according to their Effects on Human Health and the Environment

- Hazardous wastes
- Substances unsafe to use commercially, industrially, agriculturally, or economically and have any of the following properties- ignitability, corrosivity, reactivity & toxicity.
- Non-hazardous
- Substances safe to use commercially, industrially, agriculturally, or economically and do not have any of those properties mentioned above. These substances usually create disposal problems.

Classification of wastes according to their origin and type

- **Municipal Solid wastes:** Solid wastes that include household garbage, rubbish, construction & demolition debris, sanitation residues, packaging materials, trade refuges etc. are managed by any municipality.
- **Bio-medical wastes:** Solid or liquid wastes including containers, intermediate or end products generated during diagnosis, treatment & research activities of medical sciences.
- **Industrial wastes:** Liquid and solid wastes that are generated by manufacturing & processing units of various industries like chemical, petroleum, coal, metal gas, sanitary & paper etc.
- **Agricultural wastes:** Wastes generated from farming activities. These substances are mostly biodegradable.
- **Fishery wastes:** Wastes generated due to fishery activities. These are extensively found in coastal & estuarine areas.
- **Radioactive wastes:** Waste containing radioactive materials. Usually these are byproducts of nuclear processes. Sometimes industries that are not directly involved in nuclear activities, may also produce some radioactive wastes, e.g. radio-isotopes, chemical sludge etc.
- **E-wastes:** Electronic wastes generated from any modern establishments. They may be described as discarded electrical or electronic devices. Some electronic scrap components, such as CRTs, may contain contaminants such as Pb, Cd, Be or brominated flame retardants.

IMPACTS OF WASTE IF NOT MANAGED WISELY

- Affects our health
- Affects our socio-economic conditions
- Affects our coastal and marine environment
- Affects our climate

- GHGs are accumulating in Earth's atmosphere as a result of human activities, causing global mean surface air temperature and subsurface ocean temperature to rise.

- Rising global temperatures are expected to raise sea levels and change precipitation and other local climate conditions.

- Changing regional climates could alter forests, crop yields, and water supplies.

- This could also affect human health, animals, and many types of ecosystems.

- Deserts might expand into existing rangelands, and features of some of our national parks might be permanently altered.

IMPACTS OF WASTE…

- Some countries are expected to become warmer, although sulfates might limit warming in some areas.

- Scientists are unable to determine which parts of those countries will become wetter or drier, but there is likely to be an overall trend toward increased precipitation and evaporation, more intense rainstorms, and drier soils.

- Whether rainfall increases or decreases cannot be reliably projected for specific areas.

Impacts of waste....

- Activities that have altered the chemical composition of the atmosphere:

- Buildup of GHGs primarily carbon dioxide (CO_2) methane (CH_4), and nitrous oxide (N_20).

- $C0_2$ is released to the atmosphere by the burning of fossil fuels, wood and wood products, and solid waste.

- CH_4 is emitted from the decomposition of organic wastes in landfills, the raising of livestock, and the production and transport of coal, natural gas, and oil.

- $N0_2$ is emitted during agricultural and industrial activities, as well as during combustion of solid waste and fossil fuels. In 1977, the US emitted about one-fifth of total global GHGs.

Impacts of waste on health

- Chemical poisoning through chemical inhalation
- Uncollected waste can obstruct the storm water runoff resulting in flood
- Low birth weight
- Cancer
- Congenital malformations
- Neurological disease

Impacts of waste on health

- Nausea and vomiting
- Increase in hospitalization of diabetic residents living near hazard waste sites.
- Mercury toxicity from eating fish with high levels of mercury.

Effects of waste on animals and aquatics life

- Increase in mercury level in fish due to disposal of mercury in the rivers.
- Plastic found in oceans ingested by birds.
- Resulted in high algal population in rivers and sea.
- Degrades water and soil quality.

Impacts of waste on Environment

- Waste breaks down in landfills to form methane, a potent greenhouse gas
- Change in climate and destruction of ozone layer due to waste biodegradable
- Littering, due to waste pollutions, illegal dumping, Leaching: is a process by which solid waste enter soil and ground water and contaminating them.

WHAT SHOULD BE DONE

- **Reduce Waste**
  - Reduce office paper waste by implementing a formal policy to duplex all draft reports and by making training manuals and personnel information available electronically.
  - Improve product design to use less materials.
  - Redesign packaging to eliminate excess material while maintaining strength.
  - Work with customers to design and implement a packaging return program.
  - Switch to reusable transport containers.
  - Purchase products in bulk.

Preventing or reducing waste generation

Extensive use of new or unnecessary products is the root cause of unchecked waste formation. The rapid population growth makes it imperative to use secondhand products or judiciously use the existing ones because if not, there is a potential risk of people succumbing to the ill effects of toxic wastes. Disposing of the wastes will also assume a formidable shape. A conscious decision should be made at the personal and professional level to judiciously curb the menacing growth of waste.

Reduce / Waste Minimization

- The best way to deal with trash is to not have any!
- Reducing the amount of trash you have to throw out actually prevents waste from piling up in the first place.
- To reduce your waste, avoid unnecessary packaging and items designed to be used only once.
  - Reduce the need for 'single use' plastic bags by bringing your own bags when you shop, and use a travel mug when you buy coffee.
  - Choose durable, reusable products to make less trash.

WHAT SHOULD BE DONE

Reuse

- Reuse corrugated moving boxes internally.

- Reuse office furniture and supplies, such as interoffice envelopes, file folders, and paper.

- Use durable towels, tablecloths, napkins, dishes, cups, and glasses.

- Use incoming packaging materials for outgoing shipments.

- Encourage employees to reuse office materials rather than purchase new ones.

Reuse

- Reusing items can save energy and money, and prolong the item's useful life.
- Extend the life of items you buy by reusing them.
  - For example, reuse containers and jars, and donate still usable household goods and clothing to charity.

Recycle

- Every day we use products made from recycled materials.
- Take your glass, cans, newspapers, milk jugs and other acceptable recyclable items to your local transfer station, drop off location or place out for curbside collection so that they can be turned into new products like fleece jackets,
- Frisbees, paper products, and soda cans. Recycling saves money, energy, and the environment.

Compost

- Composting is nature's way of recycling organics.
- When you compost, you convert vegetable scraps, leaves, grass clippings and other materials into a nutrient rich soil material.
- You can use finished compost in your garden and around shrubs or other plants to help them grow.
- Composting also reduces the amount of materials that need to be disposed of, reducing those related costs.

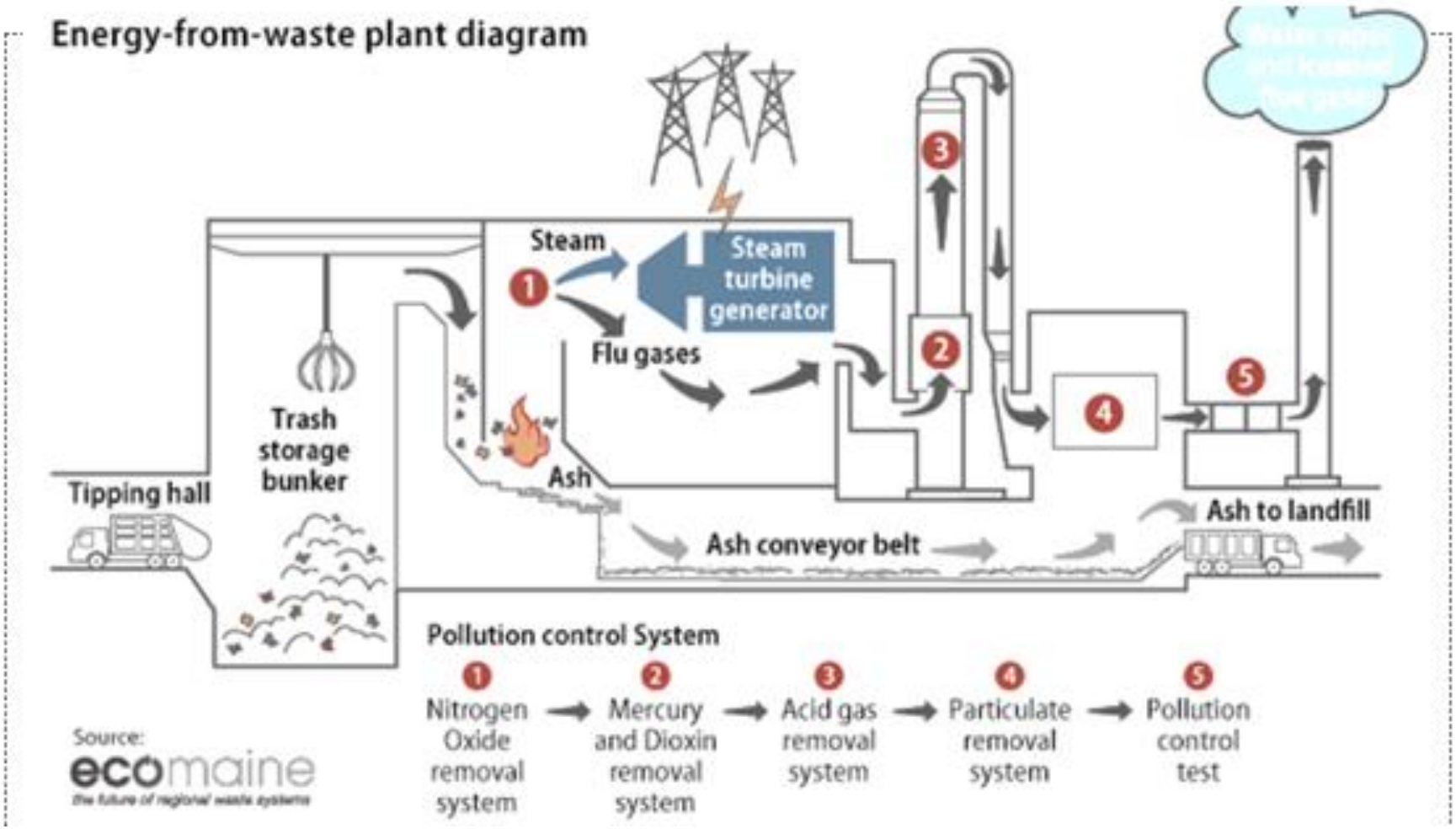
Processing and Beneficial Use

- Processing reduces the volume of materials to be landfilled and can create products such as fuel oils and steam for electricity generation.
- Beneficial use means the reuse of solid waste as a substitute for raw material in manufacturing, as construction material or fill, as a fuel, or as an agronomic soil amendment.

Waste-To-Energy

- Waste-to-Energy facilities accept our solid waste and combust it at very high temperatures, producing heat that is used to convert water into steam. The steam is used to run turbines that generate electricity.
- Scrubbers, filters, and other pollution control equipment reduce pollutants released during the incineration process. Ash and other residues from this process are landfilled.
- Over 27% of Maine's municipal solid waste was combusted in 2015.

Waste-to Energy



Landfill

- Today's landfills are very different from the old ones where people just dumped their garbage in an open area.
- Landfills are constructed and operated to strict environmental standards, including liners to protect groundwater.
- Within this hierarchy, landfilling waste is the lowest priority of the solid waste management options.

WHAT SHOULD BE DONE

Donate/Exchange

- old books
- old clothes
- old computers
- excess building materials
- old equipment to local organizations

WHAT SHOULD BE DONE

Employee Education

- Develop an “office recycling procedures” packet.

- Send out recycling reminders to all employees including environmental articles.

- Train employees on recycling practices prior to implementing recycling programs.

- Conduct an ongoing training process as new technologies are introduced and new employees join the institution.

WHAT SHOULD BE DONE

Conduct outreach program adopting an ecologically sound waste management system which includes:

- waste reduction
- segregation at source
- composting
- recycling and re-use
- more efficient collection
- more environmentally sound disposal

Residents may be organized into small groups to carry out the following:

1. construction of backyard compost pit
2. construction of storage bins where recyclable and reusable materials are stored by each household
3. construction of storage centers where recyclable and reusable materials collected by the street sweepers are stored prior to selling to junk dealers
4. maintenance of cleanliness in yards and streets
5. greening of their respective areas
6. encouraging others to join

Benefits of Waste Management

Let's take a closer look at all the advantages that the process of waste management serves:

1. **Better Environment**
   A clean and green environment to breathe in is what everyone wishes for, and waste management has a considerable contribution to the well-being of the environment and the people. Placing multiple waste disposals in cities will help the environment stay cleaner and maintain proper sanitation in the city.

2. **Reduced Pollution**
   Waste management does not merely reduce waste from the environment but also eliminates the impact of harmful greenhouse gases like methane, carbon monoxide, and carbon dioxide. This decreases the reliance on landfills for waste deposit that adversely affects the environment.

3. **Energy Conservation**
   Recycling is a big part of waste management. One classic example of saving the environment with recycling is traced back to the practice of recycling paper. If a used paper is recycled, the need to cut down more trees reduces. This helps in conserving energy and reducing carbon footprints.

4. **Increases Employment Opportunities**
   If more people start adopting waste management practices, it creates a need for organizations to sell recycled products. This creates several employment opportunities for people.
5. **Helps Create a Change**
   Although you cannot completely get rid of waste, you can reduce the waste by recycling it through eco-friendly practices. This creates a classic example for people around you to adopt the change and embrace a more sustainable approach.